Consumer Energy Research: an annotated bibliography

1983

C. Dennis Anderson
Gordon H. G. McDougall

Recherche sur la consommation d'énergie: une bibliographie annotée

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CONSUMER ENERGY RESEARCH: AN ANNOTATED BIBLIOGRAPHY
RECHERCHE SUR LA CONSOMMATION D'ÉNERGIE : UNE BIBLIOGRAPHIE ANNOTÉE
1983

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PREFACE

This document is a companion volume to Consumer Energy Research: An Annotated Bibliography, 1982 (C. Dennis Anderson and Gordon H.G. McDougall). It includes detailed annotations of over 270 consumer energy research studies, most of which were written in 1980 and 1981. This volume was prepared for the Policy Research, Analysis and Liaison Directorate of Consumer and Corporate Affairs Canada. The authors would like to acknowledge the financial support provided by the Directorate.

In preparing the annotations, the work of a number of individuals should be noted. Warren Howe, Carman Cullen and Malcolm Toland toiled with skill and good humour at the tedious task of summarizing many, often lengthy, research reports. The enormous job of typing the bibliography was done by Elsie Grogan and Susan Harder; their professionalism was of considerable assistance in the preparation of this report. Finally, the efforts of hundreds of authors and dozens of agencies are gratefully acknowledged. Their willingness to supply research studies made this annotated bibliography possible.

There are a number of other useful bibliographies and reviews for those interested in the consumer energy field. These are:

Baum, Andrew, and Singer, Jerome E., eds. (1981). Advances in Environmental Psychology. Vol. 3, Energy: Psychological Perspectives. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Bemis, Virginia (1977). Energy Guide: A Directory of Information Sources. New York: Garland Publishing Company.

Carlyle, Jamie J., and Geller, E. Scott (1978). "Behavioral Approaches to Reducing Residential Energy Consumption: A Critical Review." Working paper. Department of Psychology, Virginia Polytechnical Institute and State University.

Claxton, John D.; Anderson, C. Dennis; Ritchie, J.R. Brent; and McDougall, Gordon H.G. (1981). Consumers and Energy Conservation. New York: Praeger Publishers.

Cunningham, William H., and Lopreato, Sally Cook (1977). Consumers' Energy Attitudes and Behavior. New York: Praeger Publishers.

Ellis, Peter, and Gaskell, George (1978). "A Review of Social Research on the Individual Energy Consumer." Working paper. Department of Social Psychology, London School of Economics and Political Science, England.

Energy Mines and Resources. Energy Information Index (Annual). Ottawa.

Farhar, Barbara C.; Weis, Patricia; Unseld, Charles T.; and Burns, Barbara A. (1979). Public Opinion About Energy: A Literature Review. Solar Energy Research Institute, Golden, Colorado.

Frankena, Frederick (1977). Energy Intensity: A Selected Annotated Bibliography. Council of Planning Librarians Exchange Bibliography No. 1306. Monticello, Ill.: Vance Bibliographies.

Joerges, Bernward (1981). "Consumer Energy Research: An International Bibliography." Working paper. Internationales Institut Für Umwelt and Gesellschaft, Berlin.

Katz, Reinhard (1980). "Energy Conservation from a Consumer Perspective: A State of the Art Review." Working paper. Institut Für Marketing, Westfalrsche Wilhelms-Universitat Munster, Federal Republic of Germany.

McDougall, Gordon H.G.; Claxton, John D.; Ritchie, J.R. Brent; and Anderson, C. Dennis (1981). "Consumer Energy Research: A Review." Journal of Consumer Research 8, no. 3: 343-54.

Morrison, Denton E., et al. (1975). Energy: A Bibliography of Social Science and Related Literature. New York: Garland Publishing Company.

Morrison, Denton E., et al. (1977). Energy II: A Bibliography of 1975-1976 Social Science and Related Literature. New York: Garland Publishing Company.

Stern, Paul C., and Gardner, Gerald T. (1981). "Psychological Research and Energy Policy." American Psychologist 36, no. 4: 329-42.

In addition to the bibliographies and reviews listed above, a wide variety of sources were employed. These additional sources are listed in Table 18 (Journals), Table 19 (Conference Proceedings) and Table 20 (Other Sources).

The authors plan to continue to monitor the consumer energy research field and to print updated annotated bibliography volumes either annually or biannually. We encourage researchers who have conducted studies in the field to share their knowledge by forwarding copies of their results to either author.

In conclusion, it is hoped that this bibliography will provide useful information for both practitioners and researchers in the consumer energy field. Improved understanding of consumer energy consumption and conservation is essential if we, as a society, wish to confront and overcome the energy problems that face us today.

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AVANT-PROPOS

Le présent document va de pair avec le volume intitulé Recherche sur la consommation d'énergie : une bibliographie annotée, 1982 (C. Dennis Anderson et Gordon H.G. McDougall). Il comporte des annotations sur plus de 270 travaux de recherche sur la consommation d'énergie dont la plupart ont été rédigés en 1980 et 1981. Ce volume a été préparé pour la Direction générale de l'analyse des politiques, de la recherche et de la liaison de Consommation et Corporations Canada. Les auteurs tiennent à exprimer leur reconnaissance pour l'aide financière qu'ils ont obtenue de cette direction.

Un certain nombre de personnes ont travaillé à la préparation des annotations. Il s'agit de Warren Howe, Carman Cullen et Malcolm Toland qui ont résumé avec compétence et bonne humeur de nombreux et longs rapports de recherche. Elsie Grogan et Susan Harder se sont chargées des travaux de dactylographie; elles ont toutes deux fait preuve de beaucoup de professionalisme et ont grandement facilité la préparation de ce rapport. Il y a lieu, enfin, de signaler les efforts de centaines d'auteurs et de douzaines d'organismes qui, en acceptant de fournir des rapports de recherche, ont rendu possible la publication de cette bibliographie annotée.

Il existe un grand nombre d'autres bibliographies et études utiles pour ceux qui s'intéressent à la consommation d'énergie, entre autres les suivantes :

Baum, Andrew, and Singer, Jerome E., eds. (1981). Advances in Environmental Psychology. Vol. 3, Energy: Psychological Perspectives. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Bemis, Virginia (1977). Energy Guide: A Directory of Information Sources. New York: Garland Publishing Company.

Carlyle, Jamie J., and Geller, E. Scott (1978). "Behavioral Approaches to Reducing Residential Energy Consumption: A Critical Review." Working paper. Department of Psychology, Virginia Polytechnical Institute and State University.

Claxton, John D.; Anderson, C. Dennis; Ritchie, J.R. Brent; and McDougall, Gordon H.G. (1981). Consumers and Energy Conservation. New York: Praeger Publishers.

Cunningham, William H., and Lopreato, Sally Cook (1977). Consumers' Energy Attitudes and Behavior. New York: Praeger Publishers.

Ellis, Peter, and Gaskell, George (1978). "A Review of Social Research on the Individual Energy Consumer." Working paper. Department of Social Psychology, London School of Economics and Political Science, England.

Énergie, Mines et Ressources. Index des données énergétiques (annuel), Ottawa.

Farhar, Barbara C.; Weis, Patricia; Unseld, Charles T.; and Burns, Barbara A. (1979). Public Opinion About Energy: A Literature Review. Solar Energy Research Institute, Golden, Colorado.

Frankena, Frederick (1977). Energy Intensity: A Selected Annotated Bibliography. Council of Planning Librarians Exchange Bibliography No. 1306. Monticello, Ill.: Vance Bibliographies.

Joerges, Bernward (1981). "Consumer Energy Research: An International Bibliography." Working paper. Internationales Institut Fur Umwelt and Gesellschaft, Berlin.

Katz, Reinhard (1980). "Energy Conservation from a Consumer Perspective: A State of the Art Review." Working paper. Institut Fur Marketing, Westfalrsche Wilhelms-Universitat Munster, Federal Republic of Germany.

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Morrison, Denton E., et al. (1975). Energy: A Bibliography of Social Science and Related Literature. New York: Garland Publishing Company.

Morrison, Denton E., et al. (1977). Energy II: A Bibliography of 1975-1976 Social Science and Related Literature. New York: Garland Publishing Company.

Stern, Paul C., and Gardner, Gerald T. (1981). "Psychological Research and Energy Policy." American Psychologist 36, no. 4: 329-42.

En plus des bibliographies et des études susmentionnées, une grande variété de sources ont été utilisées. Elles figurent au tableau 18 (périodiques), au tableau 19 (actes des conférences) et au tableau 20 (autres sources).

Les auteurs ont l'intention de se tenir constamment au fait de la recherche sur la consommation d'énergie et de publier une ou deux fois par année des versions à jour de la bibliographie annotée. Nous encourageons les chercheurs qui ont effectué des travaux de recherche dans ce domaine à partager leurs connaissances en faisant parvenir des exemplaires de leurs rapports à l'un ou l'autre des deux auteurs du présent document.

Nous espérons que cette bibliographie fournira des renseignements utiles aux praticiens aussi bien qu'aux chercheurs dans le domaine de la consommation d'énergie. Il importe de mieux connaître la perspective du consommateur en matière de consommation et d'économie d'énergie, si l'on veut faire face aux problèmes énergétiques actuels et pouvoir y apporter des solutions.

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TABLE OF CONTENTS

	Page
INTRODUCTION	1
Objectives and Format	3
OVERVIEW OF STUDIES	9
Origin	9
Methodologies	9
Attitudes and Behaviour	9
Activity Area	10
Energy Form	11
Consumer Decision-making Stage	11
Product/Service Target	11
Selected Topics	11
Type of Energy Policy	12
HOW TO USE THE BIBLIOGRAPHY	17
TABLES	20
BIBLIOGRAPHY	71

TABLE DES MATIÈRES

	Page
INTRODUCTION	5
Objectifs et présentation	7
VUE D'ENSEMBLE DES ÉTUDES	13
Origine	13
Méthodes	13
Attitudes et comportements	13
Secteurs d'activité	14
Formes d'énergie	15
Étapes du processus de décision du consommateur	15
Produits et services visés	15
Sujets choisis	16
Types de politique énergétique	16
COMMENT UTILISER LA BIBLIOGRAPHIE	19
TABLEAUX	21
BIBLIOGRAPHIE	71

LIST OF TABLES

Page

Table 1 - Consumer Energy Research Trends..... 2

Table 2 - Origin of Energy Studies..... 20

Table 3 - Methodologies Used..... 22

Table 4 - Energy Consumption and Conservation Attitude/ Behaviour Studies..... 24

Table 5 - Activity Area..... 26

Table 6 - Energy Form..... 28

Table 7 - Consumer Decision-making Stage..... 30

Table 8 - Product/Service Target..... 31

Table 9 - Selected Topics..... 32

Table 10 - Type of Energy Policy Studied..... 34

Table 11 - Classification of Studies by Methodologies Used..... 36

Table 12 - Classification of Studies by Attitude/Behaviour Measures Employed..... 40

Table 13 - Classification of Studies by Activity Area..... 46

Table 14 - Classification of Studies by Energy Form..... 50

Table 15 - Classification of Studies by Product/Service Target..... 54

Table 16 - Classification of Studies by Selected Topics..... 56

Table 17 - Classification of Studies by Type of Energy Policy..... 60

Table 18 - Journals Referenced in Bibliography..... 64

Table 19 - Conference Proceedings Referenced in Bibliography..... 66

Table 20 - Other Sources Referenced in Bibliography..... 68

LISTE DES TABLEAUX

		Page
Tableau 1	- Tendance des recherches sur la consommation d'énergie.	6
Tableau 2	- Origine des études sur l'énergie.....	21
Tableau 3	- Méthodes utilisées.....	23
Tableau 4	- Études sur les attitudes et les comportements en matière de consommation et d'économie d'énergie.....	25
Tableau 5	- Secteurs d'activité.....	27
Tableau 6	- Formes d'énergie.....	29
Tableau 7	- Étapes du processus de décision du consommateur.....	30
Tableau 8	- Produits et services visés.....	31
Tableau 9	- Sujets choisis.....	33
Tableau 10	- Types de politique énergétique étudiés.....	35
Tableau 11	- Classification des études selon la méthode utilisée...	38
Tableau 12	- Classification des études selon les mesures employées relativement aux attitudes et aux comportements.....	43
Tableau 13	- Classification des études selon les secteurs d'activité.....	48
Tableau 14	- Classification des études selon la forme d'énergie....	52
Tableau 15	- Classification des études selon les produits et les services visés.....	55
Tableau 16	- Classification des études selon les sujets choisis....	58
Tableau 17	- Classification des études selon les types de politique énergétique.....	62
Tableau 18	- Périodiques mentionnés dans la bibliographie.....	64
Tableau 19	- Actes de conférences mentionnés dans la bibliographie.	67
Tableau 20	- Autres sources mentionnées dans la bibliographie.....	69

INTRODUCTION

In the 1982 bibliography, it was noted that energy was becoming an increasingly valuable and scarce resource and that energy conservation by consumers could make an important contribution towards using that resource wisely. The statement is still valid and the critical question remains one of achieving energy savings in the consumer sector while maintaining a viable economic system and equity for consumers. This bibliography attempts to provide some answers by bringing together recent research studies that examine a wide range of issues dealing with consumers and energy.

Based on the major consumer-focused studies found in the present volume and in the 1982 bibliography, consumer energy research can be segmented into two general categories. First, there is research that focuses primarily on understanding consumers, that is, understanding what they are thinking and doing about energy conservation. Second, a body of research focuses primarily on the impact of energy conservation initiatives, that is, on what actions consumers have taken in response to conservation programs (Table 1). Research included in the first category tends to be based on survey methods, while research included in the second tends to utilize experimental manipulation. It should be noted that individual studies may not fit exclusively into one of these categories. For example, a study that centres on the relationship between consumer lifestyles and energy consumption can also provide insight into the probable impact of alternative conservation incentives.

As indicated in Table 1, each of the major research categories has several subcategories. Research that focuses on understanding consumers has been of four general types: (1) opinion research, such as asking consumers what they think about the energy situation; (2) self-reported energy-conserving behaviour surveys, such as asking consumers what they have been doing to conserve energy; (3) adoption/diffusion research, such as comparing adopters and nonadopters of energy-conserving behaviours or technologies; and (4) modelling energy consumption, such as obtaining information on actual energy consumed in-home and attempting to explain variations in consumption with various predictor variables.

Research dealing with the impact of conservation initiatives has centred on four major areas: (1) information initiatives, such as pamphlets enclosed in utility bills, advertising campaigns, house-efficiency evaluations done by professional auditors, and appliance energy-consumption labels; (2) incentive initiatives, such as grants for purchase of insulation, tax credits for installation of solar equipment, and low-interest loans for the purchase of heat pumps; (3) disincentive initiatives, such as gasoline taxes, surcharge on energy-inefficient automobiles, and price rates that penalize consumption during peak periods; and (4) restriction initiatives, such as energy-efficiency standards,

Table 1

Consumer Energy Research Trends
(number of studies by year[a])

	Pre-1974	1974	1975	1976	1977	1978	1979	1980-1981	Total
Consumer Energy Research (Total)	11	27	60	86	95	83	133	150	645[b]
Understanding Consumers	8	18	37	50	53	46	75	74	361
Opinion research	--	11	14	27	25	24	46	23	170
Self-reported conservation	2	4	14	11	15	11	17	13	87
Adoption/diffusion	--	--	--	1	2	1	2	6	12
Modelling actual consumption	6	3	9	11	11	10	10	32	92
Impact of Conservation Initiatives[c]	3	6	14	24	34	27	36	64	208
Information initiatives	--	1	2	8	18	17	18	29	93
Incentive initiatives	--	1	2	4	6	3	6	16	38
Disincentive initiatives[d]	2	4	8	12	6	7	10	13	62
Restrictions	1	--	2	--	4	--	2	6	15
Overview/Discussion Papers	--	3	9	12	8	10	22	12	76

Source: Adopted from Gordon H.G. McDougall, John D. Claxton, J.R. Brent Ritchie and C. Dennis Anderson, "Consumer Energy Research: A Review", Journal of Consumer Research 8, no. 3 (December 1981): 343-54.

[a] The studies categorized in this table are major consumer-focused research efforts summarized in two annotated bibliographies, Anderson and McDougall 1982, and McDougall and Anderson 1983. Each subtype may address any of three major application areas: (1) home heating and cooling, (2) home appliances and lighting, and (3) personal transportation. Further, each subtype may focus on any of several energy types: electricity, natural gas, fuel oil, gasoline, wood, solar, wind, etc.

[b] This table contains 645 of the 721 studies included in the two bibliographies noted in note a.

[c] It should be emphasized that the entries represent the number of consumer research studies about conservation initiatives, not the number of conservation initiatives -- which would be much greater.

[d] The studies reported were restricted to the individual consumer-level studies. For example, studies of aggregate impact of prices are not included.

eliminating the use of automobiles on specified days, and devices on air conditioners that allow direct control by the electrical utility.

The Table 1 classification indicates several interesting trends. First, it is clear that interest in consumer energy research has developed rapidly and continues to expand. Second, research dealing with understanding consumers is more prevalent than that on conservation initiatives (361 versus 208 studies), although this trend is less evident in 1980-81. Third, while research on understanding consumers is primarily opinion research, this appears to be changing, with consumption modelling dominating in 1980-81.

These trends suggest a maturing of research in the field. Whereas earlier studies are primarily concerned with assessing consumer reactions to "the energy issue," recent research is more focused and reflects recognition of the complexity of this area of study. This is illustrated by recent increases in consumption modelling and conservation initiative experiments.

Objectives and Format

In preparing this annotated bibliography the authors were guided by three objectives:

1. to provide, for both practitioners and researchers, a comprehensive package of the existing information in the consumer energy research field;

2. to provide sufficient detail to enable the reader to appreciate the research and the results; and

3. to provide an index classification system that minimized the search time for a reader interested in a particular aspect of consumer energy research.

To accomplish these objectives, a concentrated effort was made to collect unpublished material as well as to review journals for relevant published articles. A wide variety of sources were contacted, including governments, utilities, research institutes and private firms. A deliberate effort was made to include agencies outside North America.

For the most part the bibliography is limited to annotations of empirical studies. However, it includes a number of descriptive reports which appear to make a significant contribution to understanding consumers and energy use. Though over 270 annotations are presented, it must be emphasized that this bibliography is in no way offered as a complete

collection of all consumer-related energy research to date. As evidenced by Table 1 the research in this area appears to be expanding exponentially, and it proved difficult and time consuming to gather all the sources that might provide relevant information.

The format of the annotations displays the author, date of publication, title and source of the study at the top of the page. Annotations of descriptive reports are presented under the single title, "Abstract." Annotations of empirical studies are divided into four parts: objectives, method, variables and findings/implications. The implications noted are those mentioned by the authors of the reports and deal, for the most part, with either public policy decisions or further research efforts.

Care was taken to provide a reasonable amount of detail in the annotations to enable the reader to understand the methodology, the results and the degree to which the implications of the study can be generalized to other situations. It is hoped that sufficient detail is provided so that it is necessary for the reader to obtain the original source for only those studies of paramount interest.

Studies are presented in alphabetical order, according to author. All studies have four-digit code numbers, with each letter of the alphabet (except for the last three letters) covering 400 numbers.

The content of the studies reviewed is classified in a series of tables presented in the following pages. The tables are intended to provide a summary of sources, types and foci of the various studies. More importantly, they are intended to aid researchers interested in specific topics to easily locate those studies most relevant to their work. The studies are categorized using a number of different classification criteria, for example, methodology used, type of energy form, type of policy initiative, and type of consumer activity. Details on the classification system are provided in the section, "How to Use the Bibliography." First, a general overview of the studies is presented.

INTRODUCTION

Dans la bibliographie de 1982, on signalait que l'énergie se faisant de plus en plus rare et chère il importait que chacun fasse sa part pour l'économiser. Cette affirmation tient toujours et l'objectif demeure de réaliser des économies d'énergie tout en assurant la viabilité du système économique et en agissant dans l'intérêt des consommateurs. Cette bibliographie nous présente une multitude de recherches récentes, portant sur divers aspects relatifs aux consommateurs et à l'énergie.

D'après les principaux travaux de recherche qu'on retrouve dans ce volume et dans la bibliographie de 1982, les recherches sur la consommation d'énergie peuvent être classées en deux catégories générales. Premièrement, les recherches qui portent surtout sur la connaissance des consommateurs, c'est-à-dire sur ce qu'ils pensent et ce qu'ils font concernant l'économie d'énergie. Deuxièmement, les recherches qui traitent fondamentalement des effets des mesures d'économie d'énergie, c'est-à-dire les mesures que les consommateurs ont prises à la suite des programmes d'économie d'énergie (tableau 1). Dans la première catégorie, les recherches sont plutôt fondées sur des méthodes d'enquête et dans la deuxième, sur l'utilisation expérimentale des données. Il y a lieu de remarquer que chaque étude, prise séparément, pourrait être classée indifféremment dans l'une ou l'autre de ces catégories, sinon dans les deux. Par exemple, une étude qui porte principalement sur les rapports entre le mode de vie des gens et la consommation d'énergie peut également donner un aperçu de l'incidence probable des mesures d'encouragement à l'économie d'énergie.

Tel qu'indiqué au tableau 1, chacune des principales catégories de recherche comporte plusieurs sous-catégories. La recherche orientée sur la connaissance des consommateurs comprend : 1) la recherche sur les opinions où l'on demande aux consommateurs ce qu'ils pensent de la situation énergétique; 2) les économies d'énergie réalisées et signalées par les consommateurs, ces derniers indiquent ce qu'ils ont fait pour économiser l'énergie; 3) l'adoption et la diffusion, il s'agit de comparer les consommateurs qui ont pris des mesures en vue d'économiser l'énergie avec ceux qui n'ont rien fait; et 4) le modèle de consommation actuelle qui est obtenu en recueillant des renseignements sur l'énergie réelle consommée à la maison, par la suite, on tente d'expliquer les changements de consommation au moyen de diverses variables que l'on peut prévoir.

La recherche traitant de l'incidence des mesures d'économie d'énergie est concentrée sur quatre principaux domaines : 1) l'information par le biais de feuillets joints aux factures envoyées par les services publics, les campagnes de publicité, l'évaluation du rendement énegétique des maisons faite par des spécialistes en la matière, et l'étiquetage des appareils ménagers en matière de consommation d'énergie; 2) les mesures d'encouragement, comme les subventions pour l'achat d'isolants, les crédits d'impôt pour l'installation du chauffage à énergie solaire

Tableau 1

Tendance des recherches sur la consommation d'énergie
(Nombre d'études par année[a])

	Avant 1974	1974	1975	1976	1977	1978	1979	1980-1981	Total
Recherche sur la consommation d'énergie (total)	11	27	60	86	95	83	133	150	645[b]
Connaissance des consommateurs	8	18	37	50	53	46	75	74	361
Recherche sur les opinions	--	11	14	27	25	24	46	23	170
Économies d'énergie réalisées et signalées par les consommateurs	2	4	14	11	15	11	17	13	87
Adoption et diffusion	--	--	--	1	2	1	2	6	12
Modèle de consommation actuelle	6	3	9	11	11	10	10	32	92
Incidence des mesures d'économie d'énergie[c]	3	6	14	24	34	27	36	64	208
Information	--	1	2	8	18	17	18	29	93
Mesures d'encouragement	--	1	2	4	6	3	6	16	38
Mesures de dissuasion[d]	2	4	8	12	6	7	10	13	62
Restrictions	1	--	2	--	4	--	2	6	15
Aperçu général - Documents de travail	--	3	9	12	8	10	22	12	76

Source : Adopté de Gordon H.G. McDougall, John D. Claxton, J.R. Brent Ritchie et C. Dennis Anderson, "Consumer Energy Research: A Review", Journal of Consumer Research, vol. 8, n° 3 (décembre 1981); pages 343 à 354.

[a] Les études signalées dans ce tableau sont des résultats de recherches orientées sur la consommation qui sont résumés dans les deux bibliographies annotées : Anderson et McDougall 1982 et McDougall et Anderson 1983. Chaque sous-catégorie peut traiter de l'un des trois principaux domaines d'application : 1) chauffage et climatisation des maisons, 2) appareils ménagers et éclairage, et 3) transport personnel. En outre, chaque sous-catégorie peut porter sur l'un des divers types d'énergie : électricité, gaz naturel, mazout, essence, bois, énergie solaire, vent, etc.

[b] Ce tableau présente 645 des 721 études incluses dans les deux bibliographies signalées à la note a.

[c] Il y a lieu de remarquer que les chiffres représentent le nombre de travaux de recherche sur la consommation qui traitent des mesures prises en matière d'économie d'énergie, et non le nombre de ces mesures qui serait alors beaucoup plus grand.

[d] Les études signalées portent strictement sur la consommation des particuliers. Les études sur l'incidence générale des prix ne sont pas incluses.

et les prêts à un taux d'intérêt peu élevé pour l'achat de pompes à chaleur; 3) les mesures de dissuasion, telles que la taxe sur l'essence, la surtaxe sur les voitures à consommation élevée et les prix plus élevés pour freiner la consommation d'énergie durant les heures de pointe; et 4) les mesures de restriction, telles que les normes de rendement en matière d'énergie, l'élimination de l'usage des automobiles certaines journées et l'installation de dispositifs sur les climatiseurs pour permettre aux services publics d'électricité d'exercer un contrôle direct.

Les données du tableau 1 indiquent plusieurs tendances intéressantes. D'abord, il est clair que l'intérêt pour la recherche sur la consommation d'énergie s'est accru rapidement et continue de prendre de plus en plus d'ampleur. Deuxièmement, les travaux de recherche portant sur la connaissance des consommateurs sont beaucoup plus nombreux que ceux qui traitent des mesures d'économie d'énergie, soit 361 par rapport à 208, même si cette tendance est moins marquée en 1980-1981. Troisièmement, la recherche sur la connaissance des consommateurs constitue fondamentalement un sondage d'opinion, toutefois cette tendance semble changer en 1980-1981 pour laisser la place au modèle de consommation d'énergie.

Cette nouvelle tendance indique une certaine évolution dans le domaine de la recherche. En effet, alors que les premières études visaient fondamentalement à déterminer les réactions des consommateurs en ce qui concerne la crise énergétique, les recherches récentes portent surtout sur la complexité de la situation visant plutôt à identifier des modèles de comportement et des mesures d'économie d'énergie.

Objectifs et présentation

Dans la préparation de cette bibliographie annotée, les auteurs ont poursuivi trois objectifs :

1. fournir aux praticiens et aux chercheurs de nombreuses sources d'information dans le domaine de la recherche sur la consommation d'énergie;

2. fournir suffisamment de renseignements pour permettre au lecteur d'évaluer la recherche et ses résultats; et

3. fournir un genre de répertoire qui facilite le travail du lecteur intéressé à un aspect particulier de la recherche sur la consommation d'énergie.

Afin de réaliser ces objectifs, un grand effort a été fait pour réunir les travaux de recherche non publiés et pour dépouiller les périodiques dans le but de répertorier les articles pertinents parus. De nombreuses autres sources ont été ajoutées, entre autres les administrations publi-

ques, les services publics, les instituts de recherche et les entreprises du secteur privé. Un effort délibéré a été fait pour inclure des organismes de l'extérieur de l'Amérique du Nord.

En majeure partie, la bibliographie est limitée aux annotations des études empiriques. Toutefois, elle inclut un certain nombre de rapports descriptifs qui semblent offrir un apport important en ce qui concerne la connaissance des consommateurs et l'utilisation de l'énergie. Même si plus de 270 annotations sont présentées, il faut signaler que la présente bibliographie ne constitue pas un répertoire complet de tous les travaux de recherche effectués à ce jour en ce qui concerne la consommation de l'énergie. Comme le montre le tableau 1, la recherche dans ce domaine semble prendre de plus en plus d'ampleur et il s'avère difficile et laborieux de rassembler toutes les sources qui pourraient offrir l'information pertinente.

Selon le mode d'annotation adopté, le nom de l'auteur, la date de publication, le titre et la source de l'étude figurent en haut de la page. Des annotations des rapports descriptifs sont présentées globalement sous le titre "Résumé". Les annotations des études empiriques se divisent en quatre parties : objectifs, méthode, variables, constatations et répercussions. Les répercussions signalées sont celles que mentionnent les auteurs des rapports et elles se rattachent, pour la plupart, aux politiques gouvernementales et à des travaux de recherche complémentaires.

Nous avons pris soin de donner suffisamment de renseignements dans les annotations pour permettre aux lecteurs de comprendre les méthodes utilisées, les résultats obtenus et la mesure dans laquelle les répercussions de l'étude peuvent s'appliquer à d'autres situations. Nous espérons avoir fourni assez de précision pour que la source originale soit nécessaire seulement dans le cas d'une étude de première importance.

Les études sont présentées par ordre alphabétique d'auteur. Elles portent toutes un code numérique de quatre chiffres et chaque lettre de l'alphabet, à l'exception des trois dernières, correspond à 400 numéros.

Le contenu des études analysées est présenté dans la série de tableaux publiés plus loin dans la présente bibliographie. Ces tableaux ont pour objet de fournir un résumé des sources, des types d'études et de leur thème. Ils visent surtout à aider les chercheurs qui s'intéressent à des sujets précis à trouver facilement les études qui leur seront le plus utiles. Les études sont classées selon divers critères, par exemple, la méthode utilisée, le type d'énergie, le type de politique et la forme d'activité de consommation. Des précisions sur le mode de classification sont données dans la section intitulée "Comment utiliser la bibliographie". Mais d'abord, voici une vue d'ensemble des études présentées.

OVERVIEW OF STUDIES

Origin

Table 2 presents the studies, classified by origin, first by country and then by source. The vast majority are American in origin, but the proportion of non-North American reports is growing (9%). While attempts were made to locate international studies, the number presented here does not reflect the actual number of studies that have been done. Considerable research is being conducted, especially in Europe, but, because of language and other barriers, few of the studies are reported here.

Distribution by source shows the diversity of the reports presented in the bibliography. Studies originate with governments, utilities, individuals, research institutes, private consulting firms and special interest groups. Some studies have a somewhat mixed origin, such as those commissioned by governments and utilities but prepared by private firms. Again, the number of studies originating with utilities (4%) underrepresents their activity. Considerable efforts are being made by utilities, but many of the studies are not reported externally and are considered proprietary information.

Methodologies

The bibliography consists mainly of empirical studies, including surveys and experiments (Table 3). A number of descriptive studies are also included. Many of the descriptive studies appear because they provide excellent summaries of research in specific areas or because they discuss conservation programs in the field and point out directions for future research efforts. A number of studies contain elements of both empirical and descriptive efforts.

Attitudes and Behaviour

Table 4 provides a summary of the attitudes and behaviour examined by the various studies. One problem with behavioural research in the consumer energy field is that it is often quite difficult to monitor actual behaviour. For example, details of actual driving habits, purchase decisions or of home-related energy behaviour are difficult and expensive to obtain. Instead, studies frequently rely upon either self-reported behaviour measures or reported behaviour intentions. The majority of the behavioural studies use surrogate measures for actual energy consumption. Some problems with this approach become apparent when one reviews the research based on actual behaviour patterns. Specifically, the lack of relationship between actual consumption and self-reported behaviour leads to serious questions concerning some of

the surrogate measures employed in consumer energy research. It suggests that studies which collect actual energy consumption data may offer more valid conclusions than studies which use either self-reported behaviour or intentions.

A number of studies probe consumers' attitudes towards various aspects of the energy situation. The apparent hypothesis is that there is some relationship between energy-related attitudes and energy-related behaviour. It is interesting to note that the conclusions and findings of the various attitude studies do tend to substantiate each other. However, as mentioned, there is a serious issue as to whether attitudes and self-reported energy-related behaviour exhibit a strong degree of association with actual energy consumption.

As indicated in Table 4 the attitude studies are grouped into nine categories. The first three (belief, seriousness and causes/blame) are self-explanatory. Studies examining attitudes concerning the individual's role in conservation generally try to discover whether consumers feel they have a role to play in conservation of energy or, conversely, whether they feel their individual efforts will have no effect on the nation's energy consumption.

Attitudes towards new technology include not only reactions to nuclear power, but also people's belief in science's ability to solve the crisis and their opinions about the feasibility of solar and other energy sources. Attitudes concerning the environment and quality of life delve into consumers' reactions to tradeoffs between pollution, developing energy sources and the perceived effects on quality of life of living with less energy. Most of the studies in this category collect information on a variety of attitudes.

Activity Area

In Table 5 the studies are classified by three general activity areas upon which they focus: home related, transportation related and lifestyle related. Some studies cover more than one area, and some monitor behaviour in virtually all activity areas. A large number examine space heating, cooling, water heating and appliance use in the home.

As might be expected by the dominance of North American studies, the bulk of the transportation-related studies are concerned with the private automobile. Those which involve public transportation deal mainly with attitudes towards alternative modes and attempt to discover why consumers do not utilize public transit to a greater extent.

The lifestyle-related studies examine various aspects of the energy situation and how these may affect leisure-time activities, including travel and in-home activities.

Energy Form

Table 6 classifies the studies by energy form and, as with other tables, some studies are included in more than one category. Several studies did not deal with specific energy forms.

The distribution of the studies by energy form does reflect, somewhat, the relative usage of the form, notably in North America. The dominance of electricity studies, however, likely reflects the ease with which residential electric consumption data can be obtained.

The nuclear studies are largely concerned with consumers' attitudes towards the use of nuclear power. Solar-related studies involve either or both the description of government and utility programs to develop and market solar power and consumers' perceptions of solar power and its potential for use in the future.

Consumer Decision-making Stage

In Table 7, studies are classified by the stage in the consumer decision-making process upon which they focus. The majority focus on the postchoice or use stage. The few that focus on the choice stage include those concerned with the choice of large versus small automobiles and with appliance choices.

Product/Service Target

Table 8 classifies the studies by the type of product/service target. In general, these studies report on consumer attitudes towards or reactions to measures designed to improve the energy efficiency of the home and/or measures designed to encourage reduced automobile use. The majority of studies focus upon appliances and automobiles. While space heating is the major user of energy in the home, the number of studies that deal with this area (e.g., retrofit) is less than one might expect.

Selected Topics

It is useful to identify certain topic areas or themes which occur in the consumer energy research field. Based on the authors' judgements, a number of topics were selected and are reported in Table 9. In particular, the authors feel that researchers should be aware of some methodological issues pertaining to this field and some of the conservation program/policy areas that have been examined.

Type of Energy Policy

Table 10 classifies studies by the type(s) of energy policy examined, mentioned, recommended, or for which attitudes are assessed. Policies are classified on two dimensions: financial-nonfinancial, and mandatory-persuasive.

Financial-persuasive policies include incentives such as tax credits (for retrofitting or buying a smaller car) and rebates (as incentives to consume less energy). Regulatory-financial policies include disincentives such as price manipulations (e.g., through taxation) by government.

Nonfinancial-persuasive policies are largely informational programs. Nonfinancial-regulatory policies are restrictive and include those involving legislating new standards for buildings, appliances and automobiles, as well as energy labelling and rationing.

Again, it should be mentioned that the classification categories used are not mutually exclusive. Most studies mention or discuss more than one of the policy types.

VUE D'ENSEMBLE DES ÉTUDES

Origine

Le tableau 2 présente les études classées selon leur origine, d'abord le pays et ensuite la source. La grande majorité est d'origine américaine mais la proportion de rapports qui ne sont pas nord-américains s'est sensiblement accrue (9%). Bien que nous ayons tenté de trouver plus d'études internationales, le nombre répertorié dans la présente publication ne correspond pas au nombre réel de travaux réalisés. D'importantes recherches sont menées, particulièrement en Europe, mais en raison de barrières linguistiques et autres, très peu de ces études sont signalées ici.

Le classement par source montre la diversité des rapports présentés dans la bibliographie. Les études sont l'oeuvre de gouvernements, de services publics, de particuliers, d'instituts de recherche, de bureaux d'experts-conseils et de diverses associations. Certaines études sont en quelque sorte d'origine mixte, par exemple, celles qui ont été commandées par des gouvernements et des services publics et réalisées par l'entreprise privée. Le nombre d'études effectuées par des services publics (4%) ne colle pas à la réalité, puisque dans les faits il y en a davantage. En effet, les services publics ont mené un grand nombre d'études, mais beaucoup d'entre elles ne sont pas publiées et sont considérées comme des documents internes.

Méthodes

La bibliographie se compose en majeure partie d'études empiriques, comportant notamment des enquêtes et des expériences (tableau 3). Un certain nombre d'études descriptives sont également mentionnées. Beaucoup d'entre elles sont signalées parce qu'elles fournissent d'excellents résumés de recherche dans des domaines précis ainsi que des orientations pour les recherches futures. Un certain nombre d'études contiennent à la fois des éléments empiriques et descriptifs.

Attitudes et comportements

Le tableau 4 présente un résumé des attitudes et des comportements analysés dans les diverses études. Le fait que les comportements réels en matière de consommation d'énergie sont difficilement observables pose un problème pour les chercheurs. Par exemple il serait difficile et coûteux d'obtenir des renseignements sur les habitudes au volant, les décisions prises par les consommateurs au moment de l'achat et le comportement des personnes en matière de consommation d'énergie à la maison. Il s'ensuit que les études dovient se fonder la plupart du temps sur les interprétations que les personnes interrogées donnent de leurs comportements ou de leurs intentions. La majeure partie des études sur

le comportement utilise des mesures de substitution, faute de données sur la consommation réelle d'énergie. Certains problèmes découlant de cette approche sont mis en lumière lorsqu'on analyse la recherche fondée sur les comportements réels. Plus précisément, l'écart qui existe entre la consommation réelle et le comportement signalé par la personne peut nous inciter à mettre en doute la validité de certaines mesures de substitution employées dans la recherche sur la consommation d'énergie. Ce fait nous porte à croire que les études qui comportent des données recueillies sur la consommation réelle d'énergie offrent des conclusions plus valables que les études fondées sur les déclarations des personnes concernant leurs comportements et leurs intentions.

Bon nombre d'études constituent une analyse des attitudes du consommateur face à certains aspects de la situation énergétique. L'hypothèse apparente est qu'il existe un certain rapport entre les attitudes et les comportements en matière de consommation d'énergie. Il est intéressant de noter que les remarques et les conclusions sur les attitudes tendent à se confirmer d'une étude à l'autre. Cependant, comme nous l'avons dit précédemment, il importe de déterminer si les attitudes et les comportements en matière de consommation d'énergie signalés par les personnes interrogées correspondent étroitement à la consommation réelle d'énergie.

Comme l'indique le tableau 4, les études sur les attitudes sont groupées en neuf catégories. Les trois premières, soit la prise de conscience de la crise énergétique, sa gravité et ses causes ainsi que ses responsables, s'expliquent d'elles-mêmes. Les études sur les attitudes face au rôle des consommateurs en matière d'économie d'énergie en général visent à déterminer si ces derniers considèrent qu'ils ont un rôle à jouer à ce niveau ou si, au contraire, ils estiment que leurs efforts individuels n'ont aucune incidence sur la consommation d'énergie sur le plan national.

Les attitudes à l'égard de la nouvelle technologie ne portent pas uniquement sur les réactions face à l'énergie nucléaire; elles concernent aussi la conviction que la science permettra de résoudre la crise de même que les opinions quant à la possibilité d'utiliser l'énergie solaire ou d'autres formes d'énergie. Des études sur les attitudes face à l'environnement et à la qualité de vie traitent des réactions des consommateurs devant la recherche d'un équilibre entre la pollution, le développement de nouvelles sources d'énergie et les effets connus d'une consommation d'énergie réduite sur la qualité de vie. La plupart des études de cette catégorie comportent des renseignements sur une foule d'attitudes.

Secteurs d'activité

Au tableau 5, les études sont classées selon trois grands secteurs d'activité : la maison, le transport et le mode de vie. Certaines études portent sur plus d'un domaine et d'autres constituent une analyse

des comportements dans presque tous les domaines du secteur d'activité. Un grand nombre traite du chauffage, de la climatisation, de l'eau chaude et des appareils ménagers utilisés à la maison.

Comme on pouvait s'y attendre, étant donné la prédominance des analyses faites en Amérique du Nord, la majeure partie des études sur le transport portent sur les voitures personnelles. Les études sur les transports en commun traitent surtout des attitudes face à d'autres modes de transport et visent à découvrir pourquoi les consommateurs n'utilisent pas davantage les transports en commun.

Les études qui portent sur les modes de vie traitent des divers aspects de la situation énergétique et de leur incidence sur les loisirs, y compris les voyages et les activités au foyer.

Formes d'énergie

Le tableau 6 classe les études selon la forme d'énergie et comme c'est le cas dans les autres tableaux, certaines portent sur plus d'une forme d'énergie, alors que d'autres traitent de l'énergie en général.

La répartition des études selon la forme d'énergie correspond assez bien à l'usage relatif de chaque forme, particulièrement en Amérique du Nord. Les études concernant l'électricité sont nombreuses, probablement parce qu'il est facile d'obtenir des données sur la consommation d'électricité à domicile.

Les études sur l'énergie nucléaire sont largement axées sur l'attitude des consommateurs face à son utilisation. Les études sur l'énergie solaire traitent de la description des programmes tant de l'État que des services publics pour exploiter et répandre l'utilisation de cette forme d'énergie. Ces études portent aussi sur l'opinion des consommateurs concernant l'énergie solaire et ses possibilités d'utilisation dans le futur.

Étapes du processus de décision du consommateur

Au tableau 7, les études sont classées selon les étapes du processus de décision. La plupart porte sur l'étape qui suit le choix ou l'utilisation. Les quelques rares études qui touchent l'étape du choix en lui-même sont celles qui traitent du choix entre une grande ou une petite voiture et entre divers appareils ménagers.

Produits et services visés

Le tableau 8 présente les études par type de produits et de services visés. En général, ces études portent sur les attitudes ou les réactions des consommateurs à l'égard des mesures conçues pour améliorer

le rendement énergétique à la maison et pour encourager les gens à moins utiliser leur voiture. La majorité des études traitent principalement des appareils ménagers et des automobiles. Même si le chauffage constitue la principale utilisation de l'énergie à la maison, le nombre d'études qui traitent de cette question est inférieur à ce que l'on pourrait croire.

Sujets choisis

Il est utile d'indiquer certains sujets ou thèmes traités dans le domaine de la recherche sur la consommation d'énergie. D'après les opinions des auteurs, un certain nombre de sujets ont été choisis et la liste figure au tableau 9. Plus précisément, les auteurs de la présente bibliographie ont l'impression que les chercheurs devraient être renseignés sur certaines questions de méthodes particulières à ce domaine et sur certains programmes ou politiques d'économie d'énergie qui ont fait l'objet d'une étude.

Types de politique énergétique

Le tableau 10 présente les études selon les types de politique énergétique mentionnés, analysés ou recommandés ou encore selon les politiques à l'égard desquelles les attitudes des consommateurs ont été examinées. Les politiques sont classées en deux catégories : celles qui comportent des mesures financières et non financières et celles qui se fondent sur la persuasion ou la réglementation.

Les politiques axées sur les mesures financières et la persuasion comprennent les crédits d'impôt, par exemple, pour la transformation des habitations ou l'achat d'une voiture plus petite, et les remises visant à inciter les gens à réduire leur consommation d'énergie. Les politiques axées sur la réglementation et les mesures financières comprennent des changements de prix à la suite d'une taxe fixée par le gouvernement, par exemple.

Les politiques fondées sur la persuasion et qui ne comportent pas de mesures financières sont souvent des programmes d'information. Les politiques qui sont orientées uniquement sur la réglementation et qui ne comprennent pas de mesures financières, sont restrictives et incluent l'adoption de nouvelles normes pour le bâtiment, les appareils ménagers, les automobiles, de même que l'étiquetage relatif à la consommation d'énergie et le rationnement.

Il convient aussi de signaler que les catégories utilisées ne s'excluent pas mutuellement. La plupart des études traitent ou examinent plus d'un type de politique.

HOW TO USE THE BIBLIOGRAPHY

The studies in the bibliography are listed alphabetically, by author, and each is assigned a four-digit code number. Except for X, Y and Z, each letter of the alphabet is assigned 400 numbers. This is done to facilitate future updates.

The main use of code numbers is to help the reader to identify studies in an area of interest. Tables 11 through 17 contain tabulations of study code numbers by major classifications of research on consumer energy use. Specifically, these tables are:

Table 11 - Classification of Studies by Methodologies Used

Table 12 - Classification of Studies by Attitude/Behaviour Measures Employed

Table 13 - Classification of Studies by Activity Area

Table 14 - Classification of Studies by Energy Form

Table 15 - Classification of Studies by Product/Service Target

Table 16 - Classification of Studies by Selected Topics

Table 17 - Classification of Studies by Type of Energy Policy

To illustrate the use of these tables, a reader interested in the effect of nonfinancial-persuasive policies (e.g., advertising programs encouraging consumers to conserve energy) would, using Table 17, select any or all of the code numbers of the studies listed in that section (under general information, government information, etc.). The code numbers would then be used to locate the relevant annotation in the bibliography.

COMMENT UTILISER LA BIBLIOGRAPHIE

Les études répertoriées dans la bibliographie sont énumérées par ordre alphabétique d'auteur et chacune porte un code numérique de quatre chiffres. À part les lettres X, Y et Z, chaque lettre de l'alphabet correspond à 400 numéros. Cette façon de faire vise à faciliter les prochaines mises à jour de la bibliographie annotée.

L'utilité principale des codes numériques est d'aider le lecteur à trouver des études dans son domaine d'intérêt. Aux tableaux 11 à 17 les études sont classées par codes numériques selon les principales catégories de recherche sur la consommation d'énergie. Ces tableaux sont les suivants :

Tableau 11 - Classification des études selon la méthode utilisée

Tableau 12 - Classification des études selon les mesures employées relativement aux attitudes et aux comportements

Tableau 13 - Classification des études selon les secteurs d'activité

Tableau 14 - Classification des études selon la forme d'énergie

Tableau 15 - Classification des études selon les produits ou les services visés

Tableau 16 - Classification des études selon les sujets choisis

Tableau 17 - Classification des études selon les types de politique énergétique

Pour utiliser ces tableaux, un lecteur intéressé aux effets des politiques axées sur la persuasion et ne comportant pas de mesures financières, c'est-à-dire les programmes de publicité encourageant les consommateurs à économiser l'énergie, utilisera le tableau 17 et choisira un ou plusieurs codes numériques d'études qui y figurent, sous le titre information générale, information gouvernementale, etc. Les codes numériques serviront alors à trouver l'annotation pertinente dans la bibliographie.

Table 2

Origin of Energy Studies

Origin	Number	Percentage
Country:		
United States	214	79
Canada	32	12
Other	25	9
	271	100
Source:		
Individual	167	62
Research institute/centre	31	11
Government department	46	17
Private organization	10	4
Utilities	11	4
Special interest group	6	2
	271	100

Tableau 2

Origine des études sur l'énergie

Origine	Nombre	Pourcentage
Pays :		
États-Unis	214	79
Canada	32	12
Autres	25	9
	271	100
Source :		
Particuliers	167	62
Centres ou instituts de recherche	31	11
Ministères gouvernementaux	46	17
Organismes privés	10	4
Services publics	11	4
Associations	6	2
	271	100

Table 3

Methodologies Used[a]

Methodology	Number
Survey (primary data)	128
Descriptive:	
Program evaluation	34
Other	69
Diffusion	2
Experiment:	
Before and after	30
After only	8
Other:	
Econometric model	19
Unspecified	7

[a] Some studies are included in more than one category.

Tableau 3

Méthodes utilisées[a]

Méthodes	Nombre
Enquête (données primaires)	128
Étude descriptive :	
Évaluation de programme	34
Autres	69
Diffusion	2
Expérience :	
Avant et après	30
Après seulement	8
Autres :	
Élaboration de modèles économétriques	19
Non indiquée	7

[a] Certaines études sont incluses dans plus d'une catégorie.

Table 4

Energy Consumption and Conservation Attitude/Behaviour Studies[a]

Type of Measure	Number
Behaviour:	
Actual behaviour patterns	63
Self-reported behaviour	85
Behaviour intentions	62
Attitudes (all categories)	99
Details on Attitudes Towards:	
Belief/knowledge of crisis	42
Seriousness of crisis	35
Causes/blame for crisis	25
Individual's role in conservation	47
Government role (general)	33
Government role (specific policies)	29
New technology	29
Environment/quality of life	20
Lifestyle	14

[a] Some studies are included in more than one category.

Tableau 4

Études sur les attitudes et les comportements en matière de consommation et d'économie d'énergie[a]

Types de mesure	Nombre
Comportements :	
Comportements réels	63
Comportements signalés par les consommateurs	85
Intentions de comportement	62
Attitudes (toutes les catégories)	99
Détails sur les attitudes face aux aspects suivants :	
Prise de conscience de la crise et connaissance de la situation	42
Gravité de la crise	35
Causes et responsables de la crise	25
Rôle du consommateur en matière d'économie d'énergie	47
Rôle du gouvernement (en général)	33
Rôle du gouvernement (politiques particulières)	29
Nouvelle technologie	29
Environnement et qualité de vie	20
Mode de vie	14

[a] Certaines études sont incluses dans plus d'une catégorie.

Table 5

Activity Area[a]

Activity Area	Number
Home Related:	
General home	94
Space heating	59
Space cooling	41
Water heating	48
Appliances	56
Other	6
Transportation Related:	
Private automobile	60
Van-/carpools	29
Public transportation	36
Vacation/leisure travel	13
Other	1
Lifestyle Related	30

[a] Some studies are included in more than one category.

Tableau 5

Secteurs d'activité[a]

Secteurs d'activité	Nombre
Maison :	
Habitation en général	94
Chauffage	59
Climatisation	41
Eau chaude	48
Appareils ménagers	56
Autres	6
Transport :	
Voiture personnelle	60
Transport coopératif en voiture ou en camionnette	29
Transport en commun	36
Déplacement (loisirs et vacances)	13
Autres	1
Mode de vie :	30

[a] Certaines études sont incluses dans plus d'une catégorie.

Table 6

Energy Form[a]

Energy Form	Number
Electricity	119
Gasoline	79
Natural gas	56
Fuel oil	46
Solar	19
Nuclear	9
Coal	2
Wood	1
Other -- general	36

[a] Some studies are included in more than one category.

Tableau 6

Formes d'énergie[a]

Formes d'énergie	Nombre
Électricité	119
Essence	79
Gaz naturel	56
Mazout	46
Énergie solaire	19
Énergie nucléaire	9
Charbon	2
Bois	1
Autres -- études générales	36

[a] Certaines études sont incluses dans plus d'une catégorie.

Table 7

Consumer Decision-making Stage[a]

Stage of Consumer Decision-making Process	Number
Prechoice	9
Choice	75
Postchoice (use)	192

[a] Some studies are included in more than one category.

Tableau 7

Étapes du processus de décision du consommateur[a]

Étapes du processus de décision du consommateur	Nombre
Avant le choix	9
Au moment du choix	75
Après le choix (utilisation)	192

[a] Certaines études sont incluses dans plus d'une catégorie.

Table 8

Product/Service Target[a]

Product/Service Target	Number
Retrofit (insulation)	41
Retrofit (furnaces)	23
Appliances	80
Automobiles	70
Conservation devices	9
Home audits	9
Commercial audits	3

[a] Some studies are included in more than one category.

Tableau 8

Produits et services visés[a]

Produits et services visés	Nombre
Transformation (isolation)	41
Transformation (appareils de chauffage)	23
Appareils ménagers	80
Automobiles	70
Appareils visant à économiser l'énergie	9
Vérification des maisons	9
Vérification des établissements commerciaux	3

[a] Certaines études sont incluses dans plus d'une catégorie.

Table 9

Selected Topics[a]

Topic	Number
Conservation Programs/Policies:	
Audits	12
Utility load control	16
Energy consumption feedback	27
Research-policy gap	13
Equity of policies	24
Methodological Issues:	
Attitude-behaviour controversy	25
Accuracy of self-reported behaviour	2
Guidelines for conducting research	2
Experimental bias	4
Study limitations	1
Other	6

[a] Some studies may be included in more than one category.

Tableau 9

Sujets choisis[a]

Sujets	Nombre
Programmes et politiques d'économie :	
Vérification	12
Contrôle de la consommation d'énergie par les services publics	16
Réactions concernant la consommation d'énergie	27
Écart entre les recherches et les politiques	13
Équité des politiques	24
Aspect des méthodes :	
Controverses relatives aux attitudes et aux comportements	25
Exactitude des comportements signalés par les consommateurs	2
Directives pour la réalisation des recherches	2
Biais des expériences	4
Limites des études	1
Autres	6

[a] Certaines études peuvent être incluses dans plus d'une catégorie.

Table 10

Type of Energy Policy Studied[a]

Policy Type		Number
Financial:		
Persuasive	- general information	7
	- voluntary efforts	6
	- tax credits	28
	- rebates	20
Regulatory	- general policy	7
	- time-of-day pricing	14
	- price changes	64
Nonfinancial:		
Persuasive	- general information	11
	- voluntary efforts	14
	- government information/education programs	60
	- utility information/education programs	14
	- other information/education programs	12
Regulatory	- general policy	6
	- rationing	34
	- standards	25
	- energy labelling	12

[a] Some studies are included in more than one category.

Tableau 10

Types de politique énergétique étudiés[a]

Types de politique		Nombre
Mesures financières :		
Persuasion	- information générale	7
	- efforts volontaires	6
	- crédits d'impôt	28
	- remises	20
Réglementation	- politique générale	7
	- fixation des prix selon le moment de la journée	14
	- changements des prix	64
Sans mesures financières :		
Persuasion	- information générale	11
	- efforts volontaires	14
	- programmes d'information et de formation gouvernementaux	60
	- programmes d'information et de formation des services publics	14
	- autres programmes d'information et de formation	12
Réglementation	- politique générale	6
	- rationnement	34
	- normes	25
	- étiquetage relatif à la consommation d'énergie	12

[a] Certaines études sont incluses dans plus d'une catégorie.

Table 11

Classification of Studies by Methodologies Used

SURVEY (Primary Data):

0005	0020	0025	0030	0035	0040	0050	0420	0425	0430
0455	0495	0500	0510	0515	0530	0535	0805	0815	0820
0830	0840	0870	0875	0877	0885	0890	0900	0910	0920
0925	0930	0935	0940	0945	0955	0965	0970	1215	1220
1230	1235	1605	1620	1630	2005	2010	2015	2025	2030
2420	2430	2440	2445	2450	2460	2845	2860	2870	2875
2890	2915	3205	3605	3610	4025	4030	4040	4045	4055
4405	4420	4435	4440	4460	4465	4805	4810	4820	4850
4855	4860	4870	4880	4885	4890	4900	4915	5205	5210
5230	5235	5605	6005	6010	6015	6030	6035	6040	6805
6810	6820	6835	6840	6860	6875	6880	7205	7215	7220
7240	7275	7280	7285	7292	7610	7615	8005	8010	8015
8405	8410	8815	8840	8850	8870	9605	9610		

EXPERIMENT (Before and After):

0015	0405	0410	0435	0475	0480	0485	0815	0855	0860
1225	1655	2020	2410	2415	2425	2805	2865	4010	4015
4035	4470	4830	4845	6865	6885	7265	8015	8810	8820

EXPERIMENT (After Only):

0440	1245	2465	2875	4825	4875	6815	8855

DESCRIPTIVE (Program Evaluation):

0415	0815	0825	0950	0960	1205	2420	2455	2835	2880
2890	2895	2900	2905	4040	4425	4430	4815	4820	4835
4845	4865	4870	4905	4910	5602	5610	6040	6045	6875
7225	7235	7310	8835						

DESCRIPTIVE (Other):

0010	0460	0470	0490	0505	0520	0525	0810	0830	0835
0845	0850	0875	0880	0895	0905	0915	0940	1215	1240
1610	1615	1625	1635	1650	2005	2405	2435	2815	2830
2840	2850	2855	2910	4005	4020	4035	4055	4415	4440
4450	4840	4890	5220	5225	6020	6405	6825	6830	6845
6850	6855	6870	7235	7245	7250	7255	7270	7290	7295
7300	7305	7310	7605	8020	8805	8825	8845	8860	

Table 11 (cont.)

DIFFUSION:

4435 6855

OTHER (Econometric Model):

0045 0845 0850 1210 1605 1640 2470 2810 2820 2825
2885 4050 4410 5215 6025 7210 7230 7260 8830

OTHER (Unspecified):

0050 0465 0865 1645 4445 4455 4865

Tableau 11

Classification des études selon la méthode utilisée

ENQUÊTE (données primaires) :

0005	0020	0025	0030	0035	0040	0050	0420	0425	0430
0455	0495	0500	0510	0515	0530	0535	0805	0815	0820
0830	0840	0870	0875	0877	0885	0890	0900	0910	0920
0925	0930	0935	0940	0945	0955	0965	0970	1215	1220
1230	1235	1605	1620	1630	2005	2010	2015	2025	2030
2420	2430	2440	2445	2450	2460	2845	2860	2870	2875
2890	2915	3205	3605	3610	4025	4030	4040	4045	4055
4405	4420	4435	4440	4460	4465	4805	4810	4820	4850
4855	4860	4870	4880	4885	4890	4900	4915	5205	5210
5230	5235	5605	6005	6010	6015	6030	6035	6040	6805
6810	6820	6835	6840	6860	6875	6880	7205	7215	7220
7240	7275	7280	7285	7292	7610	7615	8005	8010	8015
8405	8410	8815	8840	8850	8870	9605	9610		

EXPÉRIENCE (avant et après) :

0015	0405	0410	0435	0475	0480	0485	0815	0855	0860
1225	1655	2020	2410	2415	2425	2805	2865	4010	4015
4035	4470	4830	4845	6865	6885	7265	8015	8810	8820

EXPÉRIENCE (après seulement) :

0440	1245	2465	2875	4825	4875	6815	8855

ÉTUDE DESCRIPTIVE (évaluation des programmes) :

0415	0815	0825	0950	0960	1205	2420	2455	2835	2880
2890	2895	2900	2905	4040	4425	4430	4815	4820	4835
4845	4865	4870	4905	4910	5602	5610	6040	6045	6875
7225	7235	7310	8835						

ÉTUDE DESCRIPTIVE (autres) :

0010	0460	0470	0490	0505	0520	0525	0810	0830	0835
0845	0850	0875	0880	0895	0905	0915	0940	1215	1240
1610	1615	1625	1635	1650	2005	2405	2435	2815	2830
2840	2850	2855	2910	4005	4020	4035	4055	4415	4440
4450	4840	4890	5220	5225	6020	6405	6825	6830	6845
6850	6855	6870	7235	7245	7250	7255	7270	7290	7295
7300	7305	7310	7605	8020	8805	8825	8845	8860	

Tableau 11 (suite)

DIFFUSION :

4435 6855

AUTRES (modèle économétrique) :

0045 0845 0850 1210 1605 1640 2470 2810 2820 2825
2885 4050 4410 5215 6025 7210 7230 7260 8830

AUTRES (non indiquée) :

0050 0465 0865 1645 4445 4455 4865

Table 12

Classification of Studies by Attitude/Behaviour Measures Employed

ACTUAL BEHAVIOUR PATTERNS:

0020	0035	0040	0405	0410	0415	0435	0440	0475	0480
0485	0490	0830	0855	0860	0865	0870	0875	0877	0900
0930	0940	1225	1245	1655	2010	2020	2415	2420	2465
2470	2805	2835	2845	2865	4005	4010	4020	4035	4440
4450	4455	4470	4810	4825	4830	4845	4850	4875	4905
5215	5605	5610	6815	6865	6875	6885	7225	8015	8410
8820	8855	8865							

SELF-REPORTED BEHAVIOUR:

0005	0040	0405	0420	0425	0445	0455	0495	0535	0820
0830	0840	0870	0875	0910	0925	0935	0940	0945	0955
0960	0965	0970	1220	1235	1245	1620	2010	2025	2030
2420	2430	2440	2445	2450	2460	2860	2875	2890	2895
3205	3605	3610	4005	4010	4025	4030	4055	4405	4420
4435	4440	4805	4810	4820	4830	4850	4855	4860	4870
4890	4900	4915	5205	5210	5235	6005	6010	6030	6035
6835	6860	6875	7205	7280	7285	8010	8405	8410	8815
8820	8840	8850	9605	9610					

INTENTIONS TO CONSUME/CONSERVE:

0005	0020	0030	0040	0425	0445	0495	0510	0515	0535
0840	0885	0900	0905	0910	0945	0955	0960	0965	0970
1220	1230	1245	1610	2015	2410	2420	2425	2445	2450
2870	2875	2890	2895	3610	4005	4025	4030	4050	4425
4440	4460	4810	4850	4870	4890	5205	5210	6005	6015
6035	6040	6840	6860	6875	7205	7215	8005	8010	8405
8815	8835								

ATTITUDES (All Categories):

0005	0015	0020	0025	0030	0035	0040	0420	0425	0450
0495	0510	0515	0530	0535	0815	0820	0865	0870	0885
0890	0900	0905	0920	0925	0930	0935	0940	0950	0955
0960	0965	0970	1215	1220	1230	1610	1620	1645	2015
2025	2410	2420	2425	2440	2445	2450	2835	3605	3610
4005	4025	4040	4045	4055	4405	4420	4435	4440	4445
4455	4805	4815	4850	4855	4860	4865	4880	4885	4890
4905	4910	4915	5205	5235	5610	6005	6015	6035	6805
6810	6815	6820	6835	6840	6850	6855	6860	7205	7240
7270	7275	7310	7610	7615	8410	8815	8840	8870	

Table 12 (cont.)

DETAILS ON ATTITUDES TOWARDS:

Energy Crisis:

Belief/Knowledge:

0005	0015	0020	0030	0035	0420	0425	0445	0530	0535
0820	0870	0890	0905	0930	0940	0955	0970	1610	2010
2025	2410	2425	2440	3610	4025	4045	4055	4435	4445
4850	4855	4890	5205	6810	6815	6840	6850	7205	7610
8410	8840								

Seriousness:

0005	0015	0020	0030	0420	0425	0450	0820	0885	0900
0905	0920	0930	0940	0960	2010	2410	2440	2835	3605
3610	4025	4055	4435	4445	4850	4890	4915	5205	5235
6810	6815	7205	7610	8815					

Causes/Blame:

0005	0015	0020	0030	0420	0425	0445	0530	0535	0681
0930	0970	2010	2440	2450	4025	4045	4435	4445	4860
4890	5205	6840	7205	7270					

Individual's Role:

0005	0020	0025	0030	0420	0425	0495	0515	0530	0820
0870	0890	0925	0930	0935	0940	0955	0960	0965	0970
1620	2010	2410	2420	2425	2440	2450	3610	4005	4025
4045	4055	4435	4445	4455	4805	4815	4850	4855	4860
4865	4890	4910	5205	5610	7610	8410			

Government Role (General):

0005	0040	0425	0495	0515	0530	0820	0870	0940	0950
0960	2010	2425	2445	4005	4025	4040	4045	4420	4435
4445	4815	4850	4860	4865	4885	4890	5205	5610	6850
7270	7310	8410							

Government Role (Specific Policies):

0005	0020	0030	0420	0425	0445	0515	0815	0890	0940
0970	1230	2010	2015	2440	3610	4040	4850	4855	4865
5610	6015	6035	6805	6815	6820	6835	6860	7240	

New Technology:

0445	0510	0530	0820	0920	0940	0960	1215	1620	2010
2015	3610	4025	4045	4405	4440	4815	4890	5205	6005
6810	6840	6855	7215	7240	7275	7615	8815	8870	

Table 12 (cont.)

Environment/Quality of Life:

0865	0920	0940	0960	0965	1215	1645	2010	2015	4005
4025	4865	4880	4885	5610	6810	6860	7275	7615	8870

Lifestyle:

0040	0420	0495	0865	0960	0970	2025	2450	4005	4850
4865	4905	5610	6850						

Tableau 12

Classification des études selon les mesures employées relativement aux attitudes et aux comportements

COMPORTEMENTS RÉELS :

0020	0035	0040	0405	0410	0415	0435	0440	0475	0480
0485	0490	0830	0855	0860	0865	0870	0875	0877	0900
0930	0940	1225	1245	1655	2010	2020	2415	2420	2465
2470	2805	2835	2845	2865	4005	4010	4020	4035	4440
4450	4455	4470	4810	4825	4830	4845	4850	4875	4905
5215	5605	5610	6815	6865	6875	6885	7225	8015	8410
8820	8855	8865							

COMPORTEMENTS SIGNALÉS PAR LES CONSOMMATEURS :

0005	0040	0405	0420	0425	0445	0455	0495	0535	0820
0830	0840	0870	0875	0910	0925	0935	0940	0945	0955
0960	0965	0970	1220	1235	1245	1620	2010	2025	2030
2420	2430	2440	2445	2450	2460	2860	2875	2890	2895
3205	3605	3610	4005	4010	4025	4030	4055	4405	4420
4435	4440	4805	4810	4820	4830	4850	4855	4860	4870
4890	4900	4915	5205	5210	5235	6005	6010	6030	6035
6835	6860	6875	7205	7280	7285	8010	8405	8410	8815
8820	8840	8850	9605	9610					

INTENTIONS DE CONSOMMER/D'ÉCONOMISER :

0005	0020	0030	0040	0425	0445	0495	0510	0515	0535
0840	0885	0900	0905	0910	0945	0955	0960	0965	0970
1220	1230	1245	1610	2015	2410	2420	2425	2445	2450
2870	2875	2890	2895	3610	4005	4025	4030	4050	4425
4440	4460	4810	4850	4870	4890	5205	5210	6005	6015
6035	6040	6840	6860	6875	7205	7215	8005	8010	8405
8815	8835								

ATTITUDES (toutes les catégories) :

0005	0015	0020	0025	0030	0035	0040	0420	0425	0450
0495	0510	0515	0530	0535	0815	0820	0865	0870	0885
0890	0900	0905	0920	0925	0930	0935	0940	0950	0955
0960	0965	0970	1215	1220	1230	1610	1620	1645	2015
2025	2410	2420	2425	2440	2445	2450	2835	3605	3610
4005	4025	4040	4045	4055	4405	4420	4435	4440	4445
4455	4805	4815	4850	4855	4860	4865	4880	4885	4890
4905	4910	4915	5205	5235	5610	6005	6015	6035	6805
6810	6815	6820	6835	6840	6850	6855	6860	7205	7240
7270	7275	7310	7610	7615	8410	8815	8840	8870	

Tableau 12 (suite)

DÉTAILS SUR LES ATTITUDES FACE AUX ASPECTS SUIVANTS :

Crise énergétique :

Prise de conscience et connaissance de la situation :

0005	0015	0020	0030	0035	0420	0425	0445	0530	0535
0820	0870	0890	0905	0930	0940	0955	0970	1610	2010
2025	2410	2425	2440	3610	4025	4045	4055	4435	4445
4850	4855	4890	5205	6810	6815	6840	6850	7205	7610
8410	8840								

Gravité :

0005	0015	0020	0030	0420	0425	0450	0820	0885	0900
0905	0920	0930	0940	0960	2010	2410	2440	2835	3605
3610	4025	4055	4435	4445	4850	4890	4915	5205	5235
6810	6815	7205	7610	8815					

Causes et responsables :

0005	0015	0020	0030	0420	0425	0445	0530	0535	0681
0930	0970	2010	2440	2450	4025	4045	4435	4445	4860
4890	5205	6840	7205	7270					

Rôle des consommateurs :

0005	0020	0025	0030	0420	0425	0495	0515	0530	0820
0870	0890	0925	0930	0935	0940	0955	0960	0965	0970
1620	2010	2410	2420	2425	2440	2450	3610	4005	4025
4045	4055	4435	4445	4455	4805	4815	4850	4855	4860
4865	4890	4910	5205	5610	7610	8410			

Rôle du gouvernement (en général) :

0005	0040	0425	0495	0515	0530	0820	0870	0940	0950
0960	2010	2425	2445	4005	4025	4040	4045	4420	4435
4445	4815	4850	4860	4865	4885	4890	5205	5610	6850
7270	7310	8410							

Rôle du gouvernement (politiques particulières) :

0005	0020	0030	0420	0425	0445	0515	0815	0890	0940
0970	1230	2010	2015	2440	3610	4040	4850	4855	4865
5610	6015	6035	6805	6815	6820	6835	6860	7240	

Nouvelle technologie :

0445	0510	0530	0820	0920	0940	0960	1215	1620	2010
2015	3610	4025	4045	4405	4440	4815	4890	5205	6005
6810	6840	6855	7215	7240	7275	7615	8815	8870	

Tableau 12 (suite)

Environnement et qualité de vie :

0865	0920	0940	0960	0965	1215	1645	2010	2015	4005
4025	4865	4880	4885	5610	6810	6860	7275	7615	8870

Mode de vie :

0040	0420	0495	0865	0960	0970	2025	2450	4005	4850
4865	4905	5610	6850						

Table 13

Classification of Studies by Activity Area

HOME RELATED:

General:

0005	0010	0015	0025	0425	0435	0440	0460	0505	0515
0525	0530	0815	0820	0825	0830	0835	0845	0850	0855
0870	0905	0920	0935	0955	0960	0965	1205	1210	1220
1610	1615	1620	1625	1635	2010	2025	2030	2415	2425
2435	2440	2450	2455	2465	2810	2820	2825	2875	2885
2890	2895	2905	3605	3610	4005	4025	4035	4045	4055
4445	4455	4855	4860	4870	4880	4885	4890	4915	5205
5225	5235	5602	6005	6025	6805	6810	6820	6840	6860
6875	7235	7260	7270	7290	7292	7295	7305	7610	8835
8845	8855	8860	8865						

Space Heating:

0420	0430	0445	0470	0510	0840	0890	0895	0930	0940
0970	1230	1630	1640	1645	2015	2410	2445	2815	2835
2900	4040	4405	4410	4425	4430	4435	4440	4465	4815
4825	4830	4835	4845	4850	4905	5210	5215	5220	5230
5605	6010	6015	6020	6855	6880	7210	7215	7230	7240
7245	7300	8015	8020	8405	8410	8820	8840	8850	

Space Cooling:

0420	0445	0470	0480	0485	0840	0890	0895	0900	0925
0930	0940	1230	1245	1605	1630	1640	2445	2815	2835
2865	4015	4410	4425	4815	4825	4845	4850	5210	5605
6020	6855	7215	7230	8015	8020	8405	8410	8810	8820
8858									

Water Heating:

0420	0430	0445	0470	0485	0840	0890	0925	0930	0940
0970	1245	1605	1630	1640	2410	2420	2425	2445	2815
2860	2915	4015	4405	4425	4435	4440	4465	4815	4825
4850	4905	5210	5605	6015	6855	6880	7210	7215	7220
7230	8015	8020	8405	8410	8815	8820	8850		

Appliances:

0015	0020	0030	0035	0410	0420	0430	0445	0470	0480
0485	0840	0860	0875	0877	0880	0885	0890	0925	0930
0940	0970	1605	1630	1640	2410	2445	2815	2865	2915
3205	3860	4015	4410	4425	4450	4455	4465	4825	4850
4875	4905	5210	5605	6405	6815	6835	6880	7220	7230
8015	8020	8405	8410	8810	8820				

Table 13 (cont.)

Other:

Ventilation 0810

Indirect Energy Use 0865 5210

Leisure 6850

Recycling 0940

Commercial/Institutional 4470

TRANSPORTATION RELATED:

Private Automobile:

0045	0050	0420	0455	0465	0490	0495	0520	0535	0805
0830	0870	0910	0945	1220	1640	2005	2020	2030	2430
2470	2805	2840	2845	2850	2855	2870	2910	4010	4020
4030	4050	4055	4805	4820	4850	4865	4910	5220	5610
6030	6035	6040	6825	6830	6850	6865	6870	6875	7205
7250	7280	7285	7300	7310	7605	8005	8805	9605	9610

Van-/Carpools:

0040	0050	0420	0495	0910	0940	1235	1640	1650	2005
2845	2855	2870	4020	4805	4820	4865	4910	5610	6040
6825	6865	7205	7225	7250	7300	7310	8825	9605	

Public Transportation:

0050	0405	0420	0465	0490	0495	0940	0955	0960	1225
1235	1640	1650	1655	2005	2430	2845	2850	2855	2870
2910	4010	4020	4460	4805	4810	4820	4865	4900	4910
5610	6825	6865	7205	7310	9605				

Vacation/Leisure Travel:

0420	0465	0535	0945	2845	2870	4460	4865	4910	5610
6850	7280	7310							

Other:

6885

LIFESTYLE RELATED:

0050	0420	0465	0495	0865	0905	0910	0940	0945	0950
0960	0970	1235	1645	2025	2030	2435	2460	2855	4445
4460	4865	4880	4905	4910	5610	6850	7205	7280	8005

Tableau 13

Classification des études selon les secteurs d'activité

MAISON :

Habitation en général :

0005	0010	0015	0025	0425	0435	0440	0460	0505	0515
0525	0530	0815	0820	0825	0830	0835	0845	0850	0855
0870	0905	0920	0935	0955	0960	0965	1205	1210	1220
1610	1615	1620	1625	1635	2010	2025	2030	2415	2425
2435	2440	2450	2455	2465	2810	2820	2825	2875	2885
2890	2895	2905	3605	3610	4005	4025	4035	4045	4055
4445	4455	4855	4860	4870	4880	4885	4890	4915	5205
5225	5235	5602	6005	6025	6805	6810	6820	6840	6860
6875	7235	7260	7270	7290	7292	7295	7305	7610	8835
8845	8855	8860	8865						

Chauffage :

0420	0430	0445	0470	0510	0840	0890	0895	0930	0940
0970	1230	1630	1640	1645	2015	2410	2445	2815	2835
2900	4040	4405	4410	4425	4430	4435	4440	4465	4815
4825	4830	4835	4845	4850	4905	5210	5215	5220	5230
5605	6010	6015	6020	6855	6880	7210	7215	7230	7240
7245	7300	8015	8020	8405	8410	8820	8840	8850	

Climatisation :

0420	0445	0470	0480	0485	0840	0890	0895	0900	0925
0930	0940	1230	1245	1605	1630	1640	2445	2815	2835
2865	4015	4410	4425	4815	4825	4845	4850	5210	5605
6020	6855	7215	7230	8015	8020	8405	8410	8810	8820
8858									

Eau chaude :

0420	0430	0445	0470	0485	0840	0890	0925	0930	0940
0970	1245	1605	1630	1640	2410	2420	2425	2445	2815
2860	2915	4015	4405	4425	4435	4440	4465	4815	4825
4850	4905	5210	5605	6015	6855	6880	7210	7215	7220
7230	8015	8020	8405	8410	8815	8820	8850		

Appareils ménagers :

0015	0020	0030	0035	0410	0420	0430	0445	0470	0480
0485	0840	0860	0875	0877	0880	0885	0890	0925	0930
0940	0970	1605	1630	1640	2410	2445	2815	2865	2915
3205	3860	4015	4410	4425	4450	4455	4465	4825	4850
4875	4905	5210	5605	6405	6815	6835	6880	7220	7230
8015	8020	8405	8410	8810	8820				

Tableau 13 (suite)

Autres :

Ventilation 0810

Utilisation indirecte de l'énergie 0865 5210

Loisirs 6850

Recyclage 0940

Établissements commerciaux et autres établissements 4470

TRANSPORTS :

Voiture personnelle :

0045 0050 0420 0455 0465 0490 0495 0520 0535 0805
0830 0870 0910 0945 1220 1640 2005 2020 2030 2430
2470 2805 2840 2845 2850 2855 2870 2910 4010 4020
4030 4050 4055 4805 4820 4850 4865 4910 5220 5610
6030 6035 6040 6825 6830 6850 6865 6870 6875 7205
7250 7280 7285 7300 7310 7605 8005 8805 9605 9610

Transport coopératif en voiture ou en camionnette :

0040 0050 0420 0495 0910 0940 1235 1640 1650 2005
2845 2855 2870 4020 4805 4820 4865 4910 5610 6040
6825 6865 7205 7225 7250 7300 7310 8825 9605

Transports en commun :

0050 0405 0420 0465 0490 0495 0940 0955 0960 1225
1235 1640 1650 1655 2005 2430 2845 2850 2855 2870
2910 4010 4020 4460 4805 4810 4820 4865 4900 4910
5610 6825 6865 7205 7310 9605

Déplacement (loisirs - vacances) :

0420 0465 0535 0945 2845 2870 4460 4865 4910 5610
6850 7280 7310

Autres :

6885

MODE DE VIE :

0050 0420 0465 0495 0865 0905 0910 0940 0945 0950
0960 0970 1235 1645 2025 2030 2435 2460 2855 4445
4460 4865 4880 4905 4910 5610 6850 7205 7280 8005

Table 14

Classification of Studies by Energy Form

ELECTRICITY:

0010	0015	0020	0025	0030	0035	0410	0420	0435	0440
0445	0460	0470	0475	0480	0485	0500	0505	0530	0815
0820	0835	0840	0845	0850	0855	0860	0865	0870	0875
0877	0880	0885	0890	0900	0925	0930	0935	0940	0955
0965	0970	1230	1245	1605	1620	1630	1640	1645	2010
2410	2420	2425	2440	2445	2810	2815	2820	2835	2860
2865	2875	2880	2885	2890	2895	2915	3205	4015	4025
4035	4410	4425	4430	4445	4450	4455	4465	4470	4815
4825	4835	4845	4850	4870	4875	4905	4915	5210	5215
5230	5235	5605	6005	6010	6025	6405	6805	6815	6835
6880	7220	7230	7265	7290	7292	7615	8015	8020	8405
8810	8820	8835	8840	8845	8850	8855	8860	8865	

GASOLINE:

0040	0045	0050	0405	0420	0455	0465	0490	0495	0505
0520	0530	0535	0805	0820	0830	0870	0910	0940	0945
0955	1225	1235	1640	1650	1655	2005	2010	2020	2430
2470	2805	2820	2840	2845	2850	2855	2870	2910	4010
4020	4030	4050	4460	4805	4810	4820	4850	4855	4865
4890	4900	4910	4915	5235	5610	6030	6035	6805	6825
6830	6850	6865	6870	6875	6885	7205	7225	7250	7280
7285	7310	7605	8005	8010	8805	8825	9605	9610	

NATURAL GAS:

0025	0420	0430	0445	0505	0820	0830	0835	0865	0870
0940	0955	0965	0970	1230	1630	1640	1645	2010	2410
2415	2425	2440	2445	2820	2835	2880	2885	2895	2900
4025	4410	4425	4430	4445	4455	4815	4830	4850	4855
4870	4905	5210	5215	5605	6025	6405	6875	6880	7210
7235	7265	8020	8410	8840	8850				

FUEL OIL:

0025	0420	0445	0505	0820	0830	0870	0940	0955	0965
0970	1230	1640	1645	2010	2425	2440	2445	2820	2835
2880	2885	2895	2900	4025	4410	4425	4430	4445	4455
4815	4850	4855	4870	5210	5215	6025	6805	6845	6875
6880	7210	7235	8020	8840	8850				

SOLAR:

0510	0920	0940	0955	0970	1640	2015	4040	4405	4435
4440	4445	6015	6855	7215	7240	7245	7615	8815	

Table 14 (cont.)

NUCLEAR:

0005	0530	0920	1215	4445	6810	7275	7615	8870

COAL:

5215	7615

WOOD:

2010

OTHER -- GENERAL:

0410	0415	0515	0525	0895	0905	1205	1210	1610	1625
2025	2030	2430	2450	2465	2825	3605	3610	4005	4045
4055	4860	4885	4890	5220	5225	6020	6820	6840	6860
7260	7270	7292	7300	7610	8830				

Tableau 14

Classification des études selon la forme d'énergie

ÉLECTRICITÉ :

0010	0015	0020	0025	0030	0035	0410	0420	0435	0440
0445	0460	0470	0475	0480	0485	0500	0505	0530	0815
0820	0835	0840	0845	0850	0855	0860	0865	0870	0875
0877	0880	0885	0890	0900	0925	0930	0935	0940	0955
0965	0970	1230	1245	1605	1620	1630	1640	1645	2010
2410	2420	2425	2440	2445	2810	2815	2820	2835	2860
2865	2875	2880	2885	2890	2895	2915	3205	4015	4025
4035	4410	4425	4430	4445	4450	4455	4465	4470	4815
4825	4835	4845	4850	4870	4875	4905	4915	5210	5215
5230	5235	5605	6005	6010	6025	6405	6805	6815	6835
6880	7220	7230	7265	7290	7292	7615	8015	8020	8405
8810	8820	8835	8840	8845	8850	8855	8860	8865	

ESSENCE :

0040	0045	0050	0405	0420	0455	0465	0490	0495	0505
0520	0530	0535	0805	0820	0830	0870	0910	0940	0945
0955	1225	1235	1640	1650	1655	2005	2010	2020	2430
2470	2805	2820	2840	2845	2850	2855	2870	2910	4010
4020	4030	4050	4460	4805	4810	4820	4850	4855	4865
4890	4900	4910	4915	5235	5610	6030	6035	6805	6825
6830	6850	6865	6870	6875	6885	7205	7225	7250	7280
7285	7310	7605	8005	8010	8805	8825	9605	9610	

GAZ NATUREL :

0025	0420	0430	0445	0505	0820	0830	0835	0865	0870
0940	0955	0965	0970	1230	1630	1640	1645	2010	2410
2415	2425	2440	2445	2820	2835	2880	2885	2895	2900
4025	4410	4425	4430	4445	4455	4815	4830	4850	4855
4870	4905	5210	5215	5605	6025	6405	6875	6880	7210
7235	7265	8020	8410	8840	8850				

MAZOUT :

0025	0420	0445	0505	0820	0830	0870	0940	0955	0965
0970	1230	1640	1645	2010	2425	2440	2445	2820	2835
2880	2885	2895	2900	4025	4410	4425	4430	4445	4455
4815	4850	4855	4870	5210	5215	6025	6805	6845	6875
6880	7210	7235	8020	8840	8850				

ÉNERGIE SOLAIRE :

0510	0920	0940	0955	0970	1640	2015	4040	4405	4435
4440	4445	6015	6855	7215	7240	7245	7615	8815	

Tableau 14 (suite)

ÉNERGIE NUCLÉAIRE :

0005 0530 0920 1215 4445 6810 7275 7615 8870

CHARBON :

5215 7615

BOIS :

2010

AUTRES — ÉTUDES GÉNÉRALES :

0410	0415	0515	0525	0895	0905	1205	1210	1610	1625
2025	2030	2430	2450	2465	2825	3605	3610	4005	4045
4055	4860	4885	4890	5220	5225	6020	6820	6840	6860
7260	7270	7292	7300	7610	8830				

Table 15

Classification of Studies by Product/Service Target

RETROFIT (Insulation):

0025	0420	0445	0820	0830	0840	0895	0940	0960	1230
1640	2420	2445	2815	2835	2880	2885	2890	2895	2900
3610	4425	4430	4450	4855	4870	5210	6010	6805	6845
6860	7210	7220	7230	7292	7300	8020	8410	8835	8840
8850									

RETROFIT (Furnaces):

0025	0445	0820	0830	0895	1640	2445	2815	2835	2890
2895	3610	4450	4855	4870	5210	6845	7230	7292	7300
8020	8410	8835							

APPLIANCES:

0015	0020	0025	0030	0035	0410	0420	0445	0470	0480
0485	0815	0820	0840	0845	0850	0855	0860	0870	0875
0877	0880	0885	0890	0900	0925	0930	0940	0965	0970
1220	1245	1605	1630	1640	2410	2425	2440	2445	2815
2859	2860	2865	2875	2885	2890	2915	3205	3610	4015
4025	4055	4410	4425	4450	4465	4825	4845	4850	4855
4870	4875	4905	5210	5235	5605	6405	6805	6815	6835
6880	7220	7230	8015	8020	8405	8410	8810	8820	8850

AUTOMOBILES:

0040	0045	0050	0420	0455	0465	0490	0495	0520	0535
0805	0810	0870	0910	0940	1220	1225	1235	1640	1650
2005	2020	2430	2470	2805	2840	2845	2850	2855	2870
2910	3610	4010	4020	4025	4030	4050	4055	4460	4805
4810	4820	4865	4890	4900	4910	4915	5235	5602	5610
6030	6035	6040	6805	6825	6830	6850	6870	7205	7225
7280	7285	7300	7310	7605	8005	8805	8825	9605	9610

CONSERVATION DEVICES:

2815	2835	2880	2890	2900	4425	6010	6875	8835

HOME AUDITS:

2815	2835	2880	2890	2900	4425	6010	6875	8835

COMMERCIAL AUDITS:

2815	6845	7265

Tableau 15

Classification des études selon les produits et les services visés

TRANSFORMATION (isolation) :

0025 0420 0445 0820 0830 0840 0895 0940 0960 1230
1640 2420 2445 2815 2835 2880 2885 2890 2895 2900
3610 4425 4430 4450 4855 4870 5210 6010 6805 6845
6860 7210 7220 7230 7292 7300 8020 8410 8835 8840
8850

TRANSFORMATION (appareils de chauffage) :

0025 0445 0820 0830 0895 1640 2445 2815 2835 2890
2895 3610 4450 4855 4870 5210 6845 7230 7292 7300
8020 8410 8835

APPAREILS MÉNAGERS :

0015 0020 0025 0030 0035 0410 0420 0445 0470 0480
0485 0815 0820 0840 0845 0850 0855 0860 0870 0875
0877 0880 0885 0890 0900 0925 0930 0940 0965 0970
1220 1245 1605 1630 1640 2410 2425 2440 2445 2815
2859 2860 2865 2875 2885 2890 2915 3205 3610 4015
4025 4055 4410 4425 4450 4465 4825 4845 4850 4855
4870 4875 4905 5210 5235 5605 6405 6805 6815 6835
6880 7220 7230 8015 8020 8405 8410 8810 8820 8850

AUTOMOBILES :

0040 0045 0050 0420 0455 0465 0490 0495 0520 0535
0805 0810 0870 0910 0940 1220 1225 1235 1640 1650
2005 2020 2430 2470 2805 2840 2845 2850 2855 2870
2910 3610 4010 4020 4025 4030 4050 4055 4460 4805
4810 4820 4865 4890 4900 4910 4915 5235 5602 5610
6030 6035 6040 6805 6825 6830 6850 6870 7205 7225
7280 7285 7300 7310 7605 8005 8805 8825 9605 9610

APPAREILS POUR L'ÉCONOMIE D'ÉNERGIE :

2815 2835 2880 2890 2900 4425 6010 6875 8835

VÉRIFICATION DES MAISONS :

2815 2835 2880 2890 2900 4425 6010 6875 8835

VÉRIFICATION DES ÉTABLISSEMENTS COMMERCIAUX :

2815 6845 7265

Table 16

Classification of Studies by Selected Topics

CONSERVATION PROGRAMS/POLICIES:

Audits:

2815 2836 2880 2890 2900 4425 6010 6845 6875 7625
8020 8840

Utility Load Control:

0010 0815 0845 0850 0855 0890 0900 0930 1245 2815
2865 5230 5605 6005 8845 8860

Energy Consumption Feedback:

0420 0440 0465 0475 0480 0485 0860 0935 1235 1625
1635 2410 2415 2865 4015 4035 4825 4830 5605 6865
6885 7270 7300 8015 8855 8860 8865

Research-Policy Gap:

0285 0420 0865 0950 0955 1635 4445 4865 4910 5220
6030 6855 7295

Equity of Policies (Distribution Effects):

0050 0425 0455 0460 0465 0505 0865 0950 0960 0970
1635 2025 2820 2855 4815 4865 4890 5220 5610 6035
6860 6880 8405 8820

METHODOLOGICAL ISSUES:

Attitude-Behaviour Controversy:

0015 0835 0870 0955 0960 0965 0970 1220 1235 1610
2410 2425 2430 2850 4025 4445 4805 4860 4915 6825
7205 7270 7290 7295 8410

Accuracy of Self-reported Behaviour:

0040 0420

Guidelines for Conducting Research:

1615 1620

Table 16 (cont.)

Experimental Bias:

0010 2870 4810 8845

Study Limitations:

8010

Other:

0965 2435 4820 4840 4845 4905

Tableau 16

Classification des études selon les sujets choisis

PROGRAMMES ET POLITIQUES D'ÉCONOMIE D'ÉNERGIE :

Vérifications :

2815 2836 2880 2890 2900 4425 6010 6845 6875 7625
8020 8840

Contrôle de la consommation de l'énergie distribuée par les services publics :

0010 0815 0845 0850 0855 0890 0900 0930 1245 2815
2865 5230 5605 6005 8845 8860

Réactions à la consommation de l'énergie :

0420 0440 0465 0475 0480 0485 0860 0935 1235 1625
1635 2410 2415 2865 4015 4035 4825 4830 5605 6865
6885 7270 7300 8015 8855 8860 8865

Écart entre les recherches et les politiques :

0285 0420 0865 0950 0955 1635 4445 4865 4910 5220
6030 6855 7295

Équité des politiques (effets sur la distribution) :

0050 0425 0455 0460 0465 0505 0865 0950 0960 0970
1635 2025 2820 2855 4815 4865 4890 5220 5610 6035
6860 6880 8405 8820

ASPECTS RELATIFS AUX MÉTHODES :

Controverses sur les attitudes et les comportements :

0015 0835 0870 0955 0960 0965 0970 1220 1235 1610
2410 2425 2430 2850 4025 4445 4805 4860 4915 6825
7205 7270 7290 7295 8410

Exactitude des comportements signalés par les consommateurs :

0040 0420

Directives sur les travaux de recherche :

1615 1620

Tableau 16 (suite)

Biais des expériences :

0010 2870 4810 8845

Limites des études :

8010

Autres :

0965 2435 4820 4840 4845 4905

Table 17

Classification of Studies by Type of Energy Policy

FINANCIAL-PERSUASIVE:

General Information:

2415 2435 2870 4815 4865 5610 7605

Voluntary Efforts:

0420 0970 4455 4815 4865 5610

Tax Credits:

0445 0455 0820 0895 0970 1635 1640 2015 2440 2455
3610 4005 4040 4435 4440 4855 4865 4910 5220 5225
5610 6015 6405 6805 6860 7240 8820 8825

Rebates:

0420 0895 0940 0970 1635 2005 2440 2820 2825 4025
4040 4830 4865 4910 5220 5225 6405 8815 8820 8860

FINANCIAL-REGULATORY:

General Policy:

0005 0495 0955 2870 4865 5610 7605

Time-of-Day Pricing:

0010 0815 0840 0845 0850 0855 0890 0930 1625 2875
4005 5220 5225 8845

Price Changes:

0045 0050 0415 0425 0455 0460 0495 0505 0515 0520
0525 0865 0895 0910 0940 0945 1635 1640 1645 2005
2440 2455 2470 2810 2820 2825 2845 2850 2855 2885
3610 4010 4020 4025 4030 4035 4410 4455 4805 4855
4865 4885 4900 4910 5215 5225 5235 5610 6025 6030
6035 6805 6860 6865 6870 7205 7230 7250 7310 7605
8005 8010 8015 8405

NONFINANCIAL-PERSUASIVE:

General Information:

0410 0440 0805 0940 2415 2870 4865 6865 7292 8855
8865

Table 17 (cont.)

Voluntary Efforts:

0415 0420 0425 0970 1625 4445 4805 4865 4910 5225
5610 6865 7292 8810

Government Information/Education Programs:

0025 0035 0040 0415 0420 0445 0820 0825 0877 0885
0895 0925 0940 0970 1205 1625 1635 1640 2005 2015
2410 2420 2425 2450 2455 2835 2855 2885 2890 2895
3610 4005 4040 4055 4440 4445 4805 4855 4865 4870
4885 4890 4915 5220 5225 5610 6045 6405 6855 7225
7235 7240 7270 7292 8410 8815 8835 8840 8850 9605

Utility Information/Education Programs:

0020 0030 0815 0890 2815 2890 2895 4035 4425 4430
6010 7215 7292 8020

Other Information/Education Programs

0040 0420 0525 4045 4470 4805 4820 4835 4845 6865
7265 7292

NONFINANCIAL-REGULATORY:

General Policy:

2870 4865 4910 5220 5610 6830

Rationing:

0005 0050 0415 0425 0455 0490 0515 0815 0820 0900
0910 0940 0945 1220 1245 1635 2005 2440 2840 2845
2855 3610 4025 4855 4865 4910 5215 5610 6035 6860
6870 7205 8010 8805

Standards:

0420 0455 0500 0820 0870 0875 0895 0940 0960 0970
1230 1640 2455 2855 2885 4050 4435 4450 4855 4865
5225 5610 6030 6405 7230

Energy Labelling:

0015 0020 0030 0470 0875 0877 0880 0885 2885 4875
6815 6835

Tableau 17

Classification des études selon les types de politique énergétique

AVEC MESURES FINANCIÈRES - PERSUASION :

Information générale :

2415 2435 2870 4815 4865 5610 7605

Efforts volontaires :

0420 0970 4455 4815 4865 5610

Crédits d'impôt :

0445 0455 0820 0895 0970 1635 1640 2015 2440 2455
3610 4005 4040 4435 4440 4855 4865 4910 5220 5225
5610 6015 6405 6805 6860 7240 8820 8825

Remises :

0420 0895 0940 0970 1635 2005 2440 2820 2825 4025
4040 4830 4865 4910 5220 5225 6405 8815 8820 8860

AVEC MESURES FINANCIÈRES - RÉGLEMENTATION :

Politique générale :

0005 0495 0955 2870 4865 5610 7605

Fixation des prix selon le moment de la journée :

0010 0815 0840 0845 0850 0855 0890 0930 1625 2875
4005 5220 5225 8845

Changements des prix :

0045 0050 0415 0425 0455 0460 0495 0505 0515 0520
0525 0865 0895 0910 0940 0945 1635 1640 1645 2005
2440 2455 2470 2810 2820 2825 2845 2850 2855 2885
3610 4010 4020 4025 4030 4035 4410 4455 4805 4855
4865 4885 4900 4910 5215 5225 5235 5610 6025 6030
6035 6805 6860 6865 6870 7205 7230 7250 7310 7605
8005 8010 8015 8405

SANS MESURES FINANCIÈRES - PERSUASION :

Information générale :

0410 0440 0805 0940 2415 2870 4865 6865 7292 8855
8865

Tableau 17 (suite)

Efforts volontaires :

0415 0420 0425 0970 1625 4445 4805 4865 4910 5225
5610 6865 7292 8810

Programmes gouvernementaux d'information et de formation :

0025 0035 0040 0415 0420 0445 0820 0825 0877 0885
0895 0925 0940 0970 1205 1625 1635 1640 2005 2015
2410 2420 2425 2450 2455 2835 2855 2885 2890 2895
3610 4005 4040 4055 4440 4445 4805 4855 4865 4870
4885 4890 4915 5220 5225 5610 6045 6405 6855 7225
7235 7240 7270 7292 8410 8815 8835 8840 8850 9605

Programmes d'information et de formation des services publics :

0020 0030 0815 0890 2815 2890 2895 4035 4425 4430
6010 7215 7292 8020

Autres programmes d'information et de formation :

0040 0420 0525 4045 4470 4805 4820 4835 4845 6865
7265 7292

SANS MESURES FINANCIÈRES - RÉGLEMENTATION :

Politique générale :

2870 4865 4910 5220 5610 6830

Rationnement :

0005 0050 Q415 0425 0455 0490 0515 0815 0820 0900
0910 0940 0945 1220 1245 1635 2005 2440 2840 2845
2855 3610 4025 4855 4865 4910 5215 5610 6035 6860
6870 7205 8010 8805

Normes :

0420 0455 0500 0820 0870 0875 0895 0940 0960 0970
1230 1640 2455 2855 2885 4050 4435 4450 4855 4865
5225 5610 6030 6405 7230

Étiquetage relatif à la consommation d'énergie :

0015 0020 0030 0470 0875 0877 0880 0885 2885 4875
6815 6835

Table 18/Tableau 18

Journals Referenced in Bibliography
Périodiques mentionnés dans la bibliographie

Administration in Mental Health
American Journal of Community Psychology
American Psychologist
Annual Review of Energy
ASHRAE Journal
Behavior Modification
Behavior Therapy
Bell Journal of Economics
Business Horizons
Canadian Geographer
Canadian Home Economics Journal
Economic Impact
Electrical World
Energy and Buildings
Energy Communication
Energy Engineering
Energy Policy
Environment and Behavior
Environmental Management
Ergonomics
European Economic Review
Evaluation and Program Planning
Evaluation Review
Finance and Development
Home Economics Research Journal
Housing Educators Journal
Human Ecology
Journal of the Academy of Marketing Science
Journal of Applied Behavioral Analysis
Journal of Applied Psychology
Journal of Applied Social Behavioral Analysis
Journal of Applied Social Psychology
Journal of Consumer Research
Journal of Consumer Studies and Home Economics
Journal of Environmental Systems
Journal of Home Economics
Journal of Organizational Behavior Management
Journal of Property Management
Journal of Travel Research
Personality and Social Psychology Bulletin
Policy Sciences
Professional Geographer
Public Interest
Public Opinion Quarterly
Public Policy

Table 18/Tableau 18 (cont./suite)

Regional Science and Urban Economics
Review of Economics
Review of Economics and Statistics
Royal Australian Planning Institute Journal
Science Education
Social Science Quarterly
Southern Economic Journal
Technological Review
Traffic Quarterly
Transportation
Transportation Research
Urban Forum

Table 19

Conference Proceedings Referenced in Bibliography

Published Proceedings:

Administrative Sciences Association of Canada

American Institute of Decision Sciences

American Marketing Association

American Statistical Association

European Academy for Advanced Research in Marketing

Nonpublished Proceedings:

Academy of Social Sciences (Australia)

Environmental Design Research Association

European Colloquium on Economic Psychology

Tableau 19

Actes de conférences mentionnés dans la bibliographie

Actes publiés :

Association canadienne des sciences administratives

American Institute of Decision Sciences

American Marketing Association

American Statistical Association

European Academy for Advanced Research in Marketing

Actes non publiés :

Academy of Social Sciences (Australia)

Environmental Design Research Association

European Colloquium on Economic Psychology

Table 20

Other Sources Referenced in Bibliography

Government: various governments and departments within governments, including:

Consumer and Corporate Affairs Canada
Ministry for National Development, Australia
State energy offices
Swedish Council for Building Research
U.K. Department of Energy
U.S. Department of Energy
U.S. Federal Energy Administration

Universities: various published and unpublished reports from universities, including:

Energy, Environment and Resources Center, University of Tennessee
Institute of Behavioral Science, University of Colorado
Social Systems Research Institute, University of Wisconsin-Madison
Institute of Urban and Regional Research, University of Iowa

Private Sector/Other:

Australian Institute of Energy
Battelle Human Affairs Research Institute
Consumers' associations
Electrical associations (Canada and United States)
Lawrence Berkeley Laboratory
Marketing research firms
Midwest Research Institute
National Technical Information Service
Oak Ridge National Laboratory
Solar Energy Research Institute
Transportation Research Board, National Academy of Sciences

Tableau 20

Autres sources mentionnées dans la bibliographie

Gouvernement : divers gouvernements et ministères, y compris les suivants :

Consommation et Corporations Canada
Ministry for National Development, Australia
State energy offices
Swedish Council for Building Research
U.K. Department of Energy
U.S. Department of Energy
U.S. Federal Energy Administration

Universités : divers rapports publiés et non publiés des universités, y compris les suivantes :

Energy, Environment and Resources Center, University of Tennessee
Institute of Behavioral Science, University of Colorado
Social Systems Research Institute, University of Wisconsin-Madison
Institute of Urban and Regional Research, University of Iowa

Secteurs privés et autres :

Australian Institute of Energy
Battelle Human Affairs Research Institute
Associations de consommateurs
Electrical associations (Canada and United States)
Lawrence Berkeley Laboratory
Marketing research firms
Midwest Research Institute
National Technical Information Service
Oak Ridge National Laboratory
Solar Energy Research Institute
Transportation Research Board, National Academy of Sciences

BIBLIOGRAPHY/BIBLIOGRAPHIE

0005

Ahmed, Sadrudin A., Renaud de Camprieu and Paul Hope

1981 A Comparison of English and French Canadian Attitudes Toward Energy and the Environment.
Administrative Sciences Association of Canada, Marketing Proceedings.

Objective: To determine if there are any French Canadian-English Canadian cultural differences with respect to image and attitudes related to the energy crisis

Method: A survey of 524 adults, 18 years and over, in the Ottawa-Hull area of Canada was conducted, with a 70% response rate. The sample contained 198 French and 326 English respondents, and was 55% male. The English respondents were somewhat more upscale on education and social status.

Variables: Dependent: attitudes towards energy, perceptions of harm resulting from various methods of producing new energy, support for various energy policies

Independent: cultural, sociodemographic variables

Findings/implications: In comparison with the English, French Canadians have a negative image of energy and ecology. The French are not worried about the ecological impact of energy sources and prefer rationing over price increases. The French are also more likely than the English to believe that the energy crisis is politically motivated. The English showed more support for Arctic pipelines.

0010

Aigner, Dennis J., and Jerry A. Hausman
1980 Correcting for Truncation Bias in the Analysis of Experiments in Time-of-Day Pricing of Electricity.
In Stromsdorfer and Farkas, eds., Evaluation Studies Review Annual. Vol. 5. London: Sage Publications.

Abstract: This article relates to an experiment in time-of-day (TOD) pricing of electricity which took place in Arizona. Results may not be generalizable, since subjects were guaranteed they would never pay more for electricity under TOD prices than they would have under prevailing rates. Truncation bias and its correction is discussed. A model is developed to analyze consumption behaviour under a TOD pricing scheme in the form of a system of regression equations subject to various constraints and conditions, including the assumption of weak separability of electricity demand from other goods. Of interest for policy purposes is the household responsiveness to price. Without adjusting for truncation bias, own-price elasticity is estimated at -.483, while after correction for truncation the estimate is -.169. The general pattern of complementarity holds up among the quantities of electricity consumed in the peak, shoulder-peak and off-peak periods. Results, however, may still not be generalizable, since: (1) the model imposes certain assumptions concerning consumer preferences; (2) the experiment encompasses a short duration; and (3) participation in the experiment was voluntary.

0015

Allen, Chris T.
1980 Self-Perception Based Strategies for Stimulating Socially-Conscious Consumption: The Case of Energy.
Working paper 80-27, Management Research Center, University of Massachusetts at Amherst.

Objective: To evaluate the effectiveness of an attribution message vs. other message forms, when delivered in a television commercial format, for influencing individuals' dispositions and propensities to consume in an energy-conscious fashion

Method: This study was divided into two parts. In Part I, subjects (358) watched a short videotaped television program, and through the commercials were exposed to one of four promotion levels. Before and after, they reacted to statements regarding politics (thrown in as a disguising mechanism) and energy. In Part II, subjects took part in a mock refrigerator/freezer purchase. Information was supplied on seven attributes for three models: style, size, price, frost-free, icemaker, insulation and energy use. Three levels of purchase price/energy efficiency trade-off were manipulated.

Variables: Dependent: Part I: attitudes/perceptions re energy; Part II: attribute importance, information use, information importance, energy responsiveness index (evaluation of model weighted by its energy use), model chosen

Independent: promotion level: no appeal, functional appeal (stressed personal benefit), persuasive (argued that only individual action can solve the energy problem), and attribution (labelled the American consumer as a willing participant in solving the energy problem)
Purchase price/energy use: trade-offs involving three-, five- and seven-year payback periods

Findings/implications: Promotion had a significant effect on individuals' general feelings of effectiveness (GFE) and on perceptions regarding changes in their consumption (PCC). It had a stronger effect on GFE. The attribution and persuasive appeals appeared to enhance individuals' general feelings of effectiveness compared to the no appeal and functional appeal levels. Self-perception based influence strategies which can be implemented by the mass media should be evaluated as a mean of stimulating energy-conscious consumption. Promoting cost savings as the only reason to conserve is likely to produce a consumer who will conserve only when the economic reward is apparent and substantial.

0020

Allen, Chris T.
1980 Using Endorsements to Enhance the Impact of Energy Efficiency Labels: An Empirical Investigation.
Working paper 80-21, Management Research Center, University of Massachusetts at Amherst.

Objective: To provide evidence in three areas regarding the Energy Efficiency Labeling Program (EELP): (1) the link between value-basic political beliefs and initial judgements of the EELP, (2) the impact of endorsements on receptivity to the EELP, (3) developing communication strategies to heighten the influence of the EELP on individuals' consumption

Method: 477 questionnaires were distributed in Springfield, Massachusetts, and 235 were returned. There were four versions of the label shown: control (no endorsement), endorsement by the Association of Home Appliance Manufacturers, endorsement by Ralph Nader and consumer groups, both endorsements.

Variables: Dependent: valuations of the label and program -- awareness, comprehensibility, confidence, relevance, intention and desirability of government's role

Independent: demographics, attitudes and opinions re the energy crisis, treatment

Findings/implications: Respondents found the labels comprehensible and felt that the information would be useful. However, over 33% said they would dispute the accuracy of the information, and the majority agreed that the information would be of questionable reliability. Those lacking confidence tended to believe that people who conserve energy do not really help the country (do not consider that there is a link between their own consumption and the national energy shortage). They also tended to believe that the government is the cause of the energy predicament. The endorsements had a favourable influence on 6 of the 11 salient (excluding awareness) items. They influenced individuals' intentions to look for the labels but had no impact on the confidence dimension. The combined endorsement had the greatest effect. Initial reactions to the program still appear to be linked to value-basic political beliefs. Endorsements by persons with differing political perspectives may help overcome this problem.

0025

Allen, Chris T., Charles D. Schewe, and Bertil Liander
1981 Cross-Cultural Comparisons of a Conservation-Orientation Model.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 152-159.

Objective: To determine whether there are differences in the dispositions and values of Swedes and Americans which explain the more conservation-oriented habits of the Swedes

Method: Interviews were conducted in Malmo, Sweden (N = 320), and in Springfield, Massachusetts (N = 235).

Variables: Dependent: household energy consumption, perceptions of changes in consumption, attitudes. Canonical correlation was used to assess the association between conservation-oriented (C-O) consumption and each of the constructs in the C-O model. The two sample groups were also compared on each model construct.

Independent: demographics, nationality

Findings/implications: Significant differences were found between the Malmo and Springfield residents. Swedes are more externally oriented, less materialistic, less likely to believe their own behaviour affects the energy problem. There is no support, however, for the contention that Swedes more consciously and purposefully consume in a fashion to conserve energy. The Swedes seem more willing to be controlled, to accept government policy for the sake of energy conservation. Programs designed to conserve energy in the United States may prove dysfunctional if not supported by the public. The most useful approach may be one that emphasizes the individual's feelings of effectiveness and involvement in helping out with the energy problem. The target for energy conservation programs should be the affluent/heavy energy user.

0030

Allen, Chris T., and William R. Dillon
1979 On Receptivity to Information Furnished by the Public Policymaker: The Case of Energy.
In N. Beckwith et al., eds., 1979 Educators' Conference Proceedings. American Marketing Association.

Objective: To attempt to provide insights regarding differential segment receptiveness for the Energy Efficiency Labeling Program (EELP)

Method: Questionnaires were distributed to 990 households in an Ohio county in March 1977. Of these, 173 were returned in completed form. Respondents were provided with a description of the EELP.

Variables: Dependent: rated likely usefulness, adequacy, potential accuracy and reliability of the information; opinions with regard to government's role

Independent: demographics, energy attitudes, political beliefs

Findings/implications: There was a negative attitude towards the EELP with regard to the role and involvement of government. Those with conservative political beliefs tended to have stronger negative attitudes in terms of the locus of blame (for the energy crisis) dimension. Negative attitudes were also reflected in doubts relating to the informational adequacy, usefulness, importance and accuracy of the EELP. These negative evaluations were associated with a lack of concern and a feeling of ineffectiveness (about the energy crisis). Those individuals who did think that the efficiency information would be useful were skeptical about the level of concern being shown by other people. Receptivity to a specific energy-related information program may be linked to basic political values. Policymakers will have to segment the market to ensure the effectiveness of their programs. Segmenting by attitudinal variables may be one way of developing more effective strategies.

0035

Anderson, C. Dennis, and John D. Claxton
1981 Marketer and Societal Responses to Changes in the Energy Information Environment for Durable Products. Paper presented at the European Academy for Advanced Research in Marketing, Copenhagen, Denmark, March 25-27.

Objective: To empirically evaluate the extent to which Canadian marketing institutions and consumers have been affected by Canada's recent mandatory ENERGUIDE energy consumption labelling program for major appliances

Method: Interviews were conducted with: (1) manufacturers: 12 officials in six Canadian appliance manufacturing companies; (2) retailers: 93 appliance managers across Canada; (3) consumers: 1,467 questionnaires were mailed to recent refrigerator and freezer buyers, with 583 usable responses.

Variables: Dependent: reaction of manufacturers, retailers and consumers to the mandatory energy information disclosure requirement

Independent: the ENERGUIDE label

Findings/implications: The ENERGUIDE program appears to have resulted in shifts in patterns of behaviour at all three levels in the marketing system: producers, retailers and consumers. Producers, although disagreeing with the government estimates of costs and benefits of the labelling program, have sped up energy-efficiency improvement of product design. Canadian retailers have moved to stock more energy-efficient appliances; however, retailer knowledge of energy consumption appears lacking. Finally, it appears that recent shifts in consumer appliance purchase patterns are at least in part attributable to ENERGUIDE labels. Also there are favourable trends in consumer label awareness. The following barriers to consumer acceptance and utilization of the labels are identified: a general low degree of comparative shopping for appliances, a high degree of retail sales staff influence on consumer appliance decisions, low salience of energy consumption as an appliance purchase criterion, the large percentage of consumers who do not perceive significant differences in energy consumption across models.

0040

Andrle, Stephen, and Kenneth J. Dueker
1974 Attitudes Toward and Evaluation of Carpooling. Institute of Urban and Regional Research, Technical Report No. 32, University of Iowa.

Objective: To analyze the reasons why carpooling is not more common in an urban setting, with special emphasis given to three critical problems: organization, incentives and negative attitudes

Method: An attitudinal study was performed with employees of three different organizations in Iowa City, Iowa: one largely white collar, a second mainly blue collar and a third composed of the faculty-staff of the University of Iowa. A survey questionnaire was administered that contained both attitudinal and specific work trip questions. After the replies were analyzed an organizational effort was made to induce actual carpooling, the success of which was determined in a final evaluation questionnaire. The first survey was based on 1,200 replies; the follow-up was based on 300, 100 from each firm.

Variables: Dependent: attitudes towards carpooling, intentions to form carpools, behavioural response

Independent: work site characteristics, weather conditions, distance from work, travel time to work, car needs during the day, family responsibilities, variation in work schedule, present mode of transportation

Findings/implications: The initial opinions of carpooling were fairly positive, but the challenges are still considerable. The main focus should be the single driver who lives a reasonable distance away from a job in which fairly regular work hours are kept (a flexible work schedule is a formidable barrier; it appears to play a larger role in the actual success of a carpool than in respondents' perceptions of their willingness to carpool). Two major obstacles are inconvenience and loss of independence, whereas privacy and comfort do not seem to be problems. Proximity of members is a desired attribute, and the company must be willing to provide some sort of emergency transportation for those who need to travel during the day or otherwise. Conserving energy is a prime motivation to carpool: 82.6% of University employees, for example, felt that this was important. People must be made aware of the positive impacts of carpooling in both personal and environmental terms.

Andrle, Stephen, and Kenneth J. Dueker (cont.)

The follow-up study: Matching lists were made for those interested in ride-sharing, but the overall response was poor. Lack of interest and organizational problems were main reasons for the failure. Viable incentive structures, efficient organization, utilization of existing carpools and a positive commitment from the employer must all be included if future carpool programs are to be successful.

0045

Archibald, Robert, and Robert Gillingham
1980 An Analysis of the Short-Run Consumer Demand for Gasoline Using Household Survey Data.
Review of Economics and Statistics, 62, 4, 622-626.

Objective: To analyze the short-run consumer demand for gasoline for nonbusiness automobile use

Method: This study analyzes data from the 1972-73 Consumer Expenditure Survey of the Bureau of Labor Statistics. The Survey was conducted on a quarterly basis in 23 large metropolitan areas.

Variables: Dependent: gasoline consumption

Independent: prices, household income, location, family characteristics, size and characteristics of the stock of automobiles owned

Findings/implications: In the short run it is assumed that the automobile stock and demographic profile of the household do not change. The degree of urbanization of the location of a household appears to be inversely related to gasoline consumption. Female-headed households, and those with older and better educated heads, tend to consume less gasoline. Estimated elasticities are -0.566 and -0.331 for one-car and multicar subsamples, respectively. Households with low total expenditure levels have a high price elasticity, while households with high total expenditure levels have just the opposite. Price elasticity may not decrease with the level of relative prices. A series of relative price increases need not result in even smaller percentage quantity responses.

0050

Atherton, Terry J., John H. Suhrbier, and William A. Jessiman
1976 Use of Disaggregate Travel Demand Models to Analyze Car Pooling Policy Incentives.
Transportation Research Record No. 599, Transportation Research Board, National Academy of Science, Washington, D.C., pp. 35-40.

Objective: To evaluate the direct and indirect effects of various short-run policy options related to carpooling

Method: Three separate disaggregate travel demand models are integrated into a single system: (1) joint auto ownership-work mode choice model for head of household only; (2) work trip mode choice model for all workers; and (3) simultaneous frequency, destination and mode choice model for nonwork trips. Each is of the multinomial logit form and was measured by observed travel decisions of individuals by maximum likelihood estimation. A sample size of 800 Washington, D.C., area households was selected so that areawide conclusions could be drawn on a statistically significant basis.

Variables: Dependent: in-, out-of-vehicle travel time, out-of-pocket travel cost, fuel consumption

Independent: socioeconomic: income, auto availability, number of workers, household size, number of licensed drivers, type of residence; locational: distance, employment density, employment type

Findings/implications: Nine policies were analyzed, and it was found that the positive effect of a policy influencing only the work trip may be negated by the increased nonwork travel due to increased auto availability. A policy affecting both work and nonwork trips results in a greater reduction in nonwork travel because of the discretionary nature of such trips. Policies to promote carpooling also have the potential to divert traffic from transit, especially in cities with efficient transit services. The implication is that programs should be designed so that both transit and carpooling are encouraged but do not detract from each other. Long-run changes in auto ownership levels and shifts to more fuel-efficient cars result in considerable fuel savings. However, the policies analyzed may also have inequitable effects on lower-income earners. Clearly, it is recommended that a combination of individual programs be integrated and implemented as a coordinated transportation policy to achieve maximum positive results.

0405

Bachman, Wallace, and Richard Katzev
1980 The Effects of Non-Contingent Free Bus Tickets and Personal Commitment on Urban Bus Ridership.
Working paper, Psychology Department, Reed College, Portland, Oreg.

Objective: To compare the effects of free rides and commitment to a performance goal on increasing bus ridership in an urban setting

Method: Eighty-three nonbus riders were recruited for the study, conducted in 1977. Subjects were assigned to one of four conditions (groups). The treatments lasted four weeks, and behaviour was monitored for three weeks post-treatment. A telephone follow-up three months later checked on behaviour since the post-treatment period.

Variables: Dependent: number of bus rides per week

Independent: experimental conditions: (1) control: subjects received route maps and transit information; (2) commitment: information provided, and subjects agreed to take at least one round trip per week on the bus during the four weeks; (3) free tickets: information provided, and subjects were given ten free tickets (they were told they could have more if needed); (4) free tickets plus commitment

Findings/implications: Treatment groups differed significantly from control, both during treatment and in the follow-up periods. During treatment the mean numbers of bus rides per week (all subjects) were .03, .87, .83 and 1.28 for the four groups respectively. The percentages of subjects who rode the bus one or more times were 5%, 59%, 43% and 88% respectively. The only significant difference between treatments was between free tickets and free tickets plus commitment: the mean number of rides per week during the 12-week follow-up were 3.20 and .97 respectively. This difference was caused by two subjects in the free ticket group who rode the bus 120 and 80 times during the follow-up period. Ridership remained above pretreatment levels during the follow-up for all four groups. Offering free rides would seem to be an economically feasible means of increasing ridership, as the amount spent by free riders post-treatment exceeded the cost of the free tickets given away during treatment. Inducing individuals to ride the bus may be enough to remove the obstacles that keep them off the buses. In research of this type, the effects on automobile usage should be studied, if the ultimate goal is gasoline conservation.

0410

Baird, John C., and Judith M. Brier
1981 Perceptual Awareness of Energy Requirements of Familiar Objects. Journal of Applied Psychology, 66, 1, 90-96.

Objective: To assess people's perceptions of the energy requirements of a variety of familiar objects and to provide a foundation for future research into energy awareness and conservation

Method: Three experiments were conducted: (1) Free Sorting Task, in which 48 volunteers sorted 61 items into groups according to general similarity, with no criteria specified by the researchers; the subjects were then required to sort the products into groups according to which objects they felt consumed similar amounts of energy; (2) Rank-Order Task, in which 24 of the subjects from (1) were required to rank order 19 household appliances from least to most in terms of the amount of energy consumed in an hour of continuous operation; and (3) Magnitude Estimation, in which 20 of the subjects from (1) who had not participated in (2) were required to estimate the magnitude of energy consumption of various appliances using the energy consumption of a clothes washer as 100 units.

Variables: Dependent: (1) groups with no criteria, groups with energy consumption as a criterion; (2) rank order of 19 appliances; (3) estimates of magnitude of energy consumption

Independent: various appliances

Findings/implications: (1) Without prompting criteria, the subjects tended to group the articles by function (e.g., transportation, source of light). When the energy consumption criterion was specified the subjects tended to sort by size of the object. It was also found that subjects grouped items by source of energy as well. (2) The subjects did fairly well on the rank-order task, but (3) less well in magnitude estimates. The authors conclude that people do have some knowledge of energy but too often tend to equate size of the product and energy consumption. The authors feel that the main benefits of their study lie in educational programs to inform and perhaps direct the public in effective ways of using energy.

0415

Beck, Paul Allen
1980 Correlates of Energy Conservation.
Public Policy, 28, 4, 451-471.

Objective: To discover what Americans are doing to conserve energy and what factors have influenced this behaviour

Method: Analysis is based on data collected during 779 personal interviews in the Pittsburgh area in early 1978. Multiple linear regression was used to assess the effect of the "explanatory" variables.

Variables: Dependent: energy conservation behaviour

Independent: residence attributes, attitudes and perceptions re energy and energy conservation, demographics

Findings/implications: Ownership of residence bears the strongest relationship to conservation: homeowners were much more likely to conserve than nonowners. Even renters who paid their own utilities were less likely than owners to conserve. Home ownership accounts for 13% of the variance in conservation. Next in significance are attitudes and perceptions, accounting for 10%. Most important of the attitudes are energy sophistication (blame for the crisis), satisfaction gained from conserving, concern about the energy situation, and hardship suffered during the coal strike. An antimaterialism variable is also associated with conservation. Three other variables were significant only in the regression analysis: specific political trust (associated positively with conservation), general political trust (associated negatively), cost consciousness (positively). Demographic variables account for 5% of the variance in conservation. The two important components are age and race (younger persons and white persons are more apt to conserve). Elasticities of demand for energy seem to vary substantially across groups. Middle- and upper-income groups seem to be logical targets for conservation. Higher energy prices will have an enormous impact on lower-income groups. Voluntary conservation efforts are an alternative to encouraging conservation through manipulation of prices. Crisis rhetoric and crisis experience may promote conservation. Concentration on attitudes and perceptions should be a high priority of campaigns to increase conservation efforts.

0420

Beck, Paul, Samuel I. Doctors, and Paul Y. Hammond
1980 Individual Energy Conservation Behaviors.
Cambridge, Mass.: Oelgeschlager, Gunn & Hain, Inc.

Abstract: This volume contains a detailed analysis of today's energy concern and reports the results of Project Monitor, a study of consumers' energy attitudes and behaviour. A general discussion of the history of the energy problem and a review of current empirical studies preludes the study itself, which comprises a large portion of the book. Over 1,000 Pittsburgh households were interviewed to discover attitudes, situational factors and perceptions of energy conservation. Specific conservation actions are related to 24 assorted variables, and correlations are made between independent and dependent variables to distinguish conservers from nonconservers. The impact on households of two exogenous events during the period of study is also considered. The findings are then summarized and several recommendations regarding conservation policy are made. Great emphasis is placed on educational and persuasive campaigns; financial and nonfinancial incentives; a strong government coordinating effort; and utilization of feedback to promote conservation in heating, cooling, appliance use, transportation and electricity usage. The results are a valuable aid for policymakers but also underscore the need for further research on energy conservation. An understanding of how American consumers view and practise conservation, the topic of this book, is a vital basis for sound policy decisions in the energy field.

0425

Beck, Richard A., et al.
1980 Reducing Consumption in Periods of Acute Scarcity: The Case of Water.
In Stormsdorfer and Farkas, eds., Evaluation Studies Review Annual. Vol. 5. London: Sage Publications.

Objective: To examine the impact of water conservation efforts in four California communities

Method: Data came from four communities, comprising a total population of approximately 110,000. Water consumption data were gathered on an aggregate basis from 1970 to 1977. Water conservation programs were conducted by the communities, to varying degrees.

Variables: Dependent: water consumption

Independent: elements of water conservation program (including information, news releases, feedback, rationing, eliminating declining block tariff); domestic vs. agricultural consumer; price of water

Findings/implications: Water consumption for both domestic and agricultural areas was altered by changes in price, conservation appeals or both. Price elasticities were somewhat larger for agricultural consumers than for domestic consumers. For water at least, the dilemma of the commons can be solved without resorting to dictatorial measures. Estimates of the differential effectiveness of the different kinds of conservation measures are not provided, however, so no recommendations are given to policymakers as to the appropriate mix of policy. Theory and data thus suggest a number of factors enhancing conservation: (1) a belief that a shortage exists and constitutes a problem for the group with which the individual identifies; (2) a moral commitment to "fair" contributions to group welfare; (3) a belief in the efficacy of personal efforts to achieve a group solution; (4) a belief that the personal cost of inconvenience resulting from conservation efforts will not be great; (5) a belief that others in the relevant group will also conserve.

0430

Becker, Lawrence J., et al.
1981 Relating Between Attitudes and Residential Energy Use. Environment and Behavior, 13, 5, 590-609.

Objective: To determine the relationship between homeowners' attitudes and their winter gas consumption

Method: During the winter, 207 couples completed questionnaires about their energy-related attitudes, and a factor analysis was performed.

Variables: Dependent: natural gas consumption

Independent: attitudes

Findings/Implications: Thermal comfort was the most important determinant of household energy use. It was also found that attitudes towards energy-related issues remained fairly constant over seasons. There was a significant positive correlation between summer and winter energy consumption. Moreover, husbands' and wives' energy-related attitudes were found to be significantly correlated. The only factors, from the questionnaire, to be correlated with actual gas use were personal comfort and convenience, optimism/belief in science, and health factors.

0435

Becker, Lawrence J., Vita C. Rabinowitz, and Clive Seligman
1980 Evaluating the Impact of Utility Company Billing Plans on Residential Energy Consumption.
Evaluation and Program Planning, 3, 159-164.

Objective: To investigate the impact of utilities providing customers with an average payment plan (a fixed-sum utility bill each month with a final settlement at the end of the year) as opposed to the conventional "pay as you go" billing procedure

Method: A nonequivalent control group design was used to study the electricity consumption of two utility companies (Ns = 475 and 74). The summers of 1975 and 1976 were chosen as the pretest and post-test periods.

Variables: Dependent: electricity consumption

Independent: the type of payment plan (average vs. standard)

Findings/implications: Because customers on average payment plans are protected from paying large bills during peak energy use seasons and because the energy use and its cost are perhaps less salient to them, it was hypothesized that they would use more electricity than customers not on the plan. The results of the study did not support this hypothesis; the average payment plan apparently had no effect on electricity consumption.

0440

Becker, Lawrence J., and Clive Seligman
1978 Reducing Air Conditioning Waste by Signalling It Is Cool Outside. Personality and Social Psychology Bulletin, 4, 3, 412-415.

Objective: To investigate the effects on summer electricity use of both a consumption feedback procedure and a cool weather signalling device

Method: Forty families living in identical dwellings in central New Jersey were randomly assigned to one of four conditions: signalling device only, feedback information only, signalling device plus feedback, neither (control)

Variables: Dependent: actual electricity consumption

Independent: treatment

Findings/implications: The results indicate that the signalling device was effective in alerting homeowners to a savings opportunity of which they apparently took advantage. The feedback treatment, however, failed to be effective; the authors explain that this may be attributable to the lack of credibility of the feedback figures.

0445

Behavior Research Center, Inc.
1979 Survey of Current and Potential Home Energy Management Activities Among Urban Homeowners in Arizona.
Prepared for the Arizona Office of Energy Programs.

Objective: To determine: (1) which groups have the highest propensity to implement specific energy management practices, (2) which of the practices are most likely to be used, (3) how to most effectively communicate the practices to target market segments

Method: In-home interviews were conducted with 812 homeowners in Phoenix and Tucson during March 1979.

Variables: Dependent: perceptions of own energy knowledge; concern about saving energy; information sources used; awareness of state programs; use of energy tax credit; belief in the energy crisis and how it might be solved; energy conservation activities (day-to-day and home improvements); perceptions about the costs/benefits of conservation activities; perceptions about conservation promotional campaigns

Independent: demographics, home characteristics

Findings/implications: About half claimed to be well-informed about how to use energy efficiently around the home. Over two-thirds were "strongly concerned" about reducing their energy waste (persons over 35 showed more concern). The most common sources of information were utility pamphlets and local news stories. Nearly half (45%) were unaware of an existing federal tax credit program for energy improvements, and 78% were unaware of a similar state program. Only 5% had ever used such tax credits -- they tended to be of middle income, younger and college educated. The possibility of experiencing energy shortages was perceived as a real threat by 55%, but as a contrived fraud by 42%. Most homeowners undertake only cosmetic and/or sporadic practices to save energy. One-third had done nothing in terms of making their homes more energy efficient; persons in this group tended to be of lower income, less educated, younger, living in newer homes and less concerned about energy management. Those who believe they could be doing more to make their homes energy efficient tended to be older, of higher income groups, at least high school educated and more interested in spending money to improve their homes in the next year. A generalized communication effort is recommended, rather

Behavior Research Center, Inc. (cont.)

than one targeted to narrower groups. The most significant inhibitors to action can be classified into four basic groups: (1) uncertainty as to what works, (2) uncertainty as to where to begin, (3) fear of technical incompetence, and (4) uncertainty as to what is cost effective. Homeowners need to be provided with a systematic, step-by-step set of procedures to follow.

0450

Belch, Michael A.
1979 Identifying the Socially and Ecologically Concerned Segment Through Life-Style Research: Initial Findings. In Karl Henion and Thomas Kinnear, eds., The Conserver Society. American Marketing Association.

Objective: To report on preliminary findings resulting from an attempt to establish a basis for segmentation of the "socially concerned" market

Method: A questionnaire was administered to 125 persons in San Diego County, California. Well's (1971) Attitude, Interest and Opinion (AIO) inventory was used as the independent variable(s).

Variables: AIO inventory: activities, interests and opinions (e.g., concern over air, noise and water pollution, littering, energy shortages and the future for energy)

Pearson product-moment correlations were computed for the 40 AIOs and their relationship to the total concern index and to the individual subscales

Findings/implications: Energy concerns accounted for 25% of the total variance of the social and ecological variables. Those more likely to be concerned with ecological problems, energy supplies and physical well-being can best be characterized as more liberal, more self-assured of their present and future status, and more socially and physically active.

0455

Bellur, Venkatakrishna V.
1980 Gasoline Consumption: Can It Be Curtailed?
Journal of the Academy of Marketing Science, B, 3, 171-181.

Objective: To estimate the elasticity of the demand for gasoline in relation to a number of factors

Method: A questionnaire was administered to 152 households in three cities in upper Michigan. A total of 232 cases were analyzed (more than one car per household).

Variables: Dependent: annual gasoline consumption per automobile. Multiple regression analysis is used to assess the impact of the independent variables

Independent: automobile weight, annual mileage, essential/nonessential driving, price of gasoline, disposable income, discretionary income, automobile age

Findings/implications: The elasticity of gasoline consumption in relation to a number of the variables was as follows: weight, .372; mileage, .456; price of gasoline, .403; take-home pay, -.098; discretionary income, .010; age of car, -.032. Policies formulated by the government should emphasize a reduction in automobile weight, the elimination of gas guzzling gadgets and the avoidance of higher prices to minimize the burden on low-income households. It may be necessary to formulate a two-price policy in order to make gasoline available at reasonable prices to low-income families. Part of this policy could include a quota system, with tax credits granted for unused quotas.

0460

Berg, Sanford V., and William E. Roth
1976 Some Remarks on Residential Electricity Consumption and Social Rate Structuring.
Bell Journal of Economics, 7, 690-698.

Abstract: Pricing schedules are constructed to achieve social goals, mainly in terms of allowing everyone to maintain a minimum standard of living. Three alternative social rate structures -- lifeline rates, fuel stamps and direct cash subsidies -- are analyzed in terms of increasing consumer welfare with minimum social costs. The three policies are compared within the context of the theory of the consumer under nonlinear budget constraints. Lifeline rate structures provide subsidized rates for low consumers of electricity on the assumption that lower consumption levels are associated with lower incomes. High users subsidize the low users, and this may penalize those lower-income consumers who are high users. Fuel stamp programs concentrate on lower-income consumers who qualify for the program. A direct cash subsidy is less constraining than a fixed fuel stamp program and therefore allows recipients to attain a higher level of welfare for a given tax subsidy. The fuel stamp program is a second choice, preferred over lifeline rate structures.

0465

Berkman, Herman G.
1980 Some Perspectives on Transportation in the Next Decade. Traffic Quarterly, 34, 1, 143-154.

Abstract: While population and urban settlement will continually expand away from the inner cities, energy scarcities will reduce this expansion considerably. As manifestations of these energy scarcities, less comfortable automobiles and a 55 mph speed limit will create a demand for shorter trips. The demographic trends toward greater independence, more personal lifestyles and increased mobility will be strongly challenged in an era of energy shortages. Another problem is the inner cities, which will stagnate further if minority racial groups are not included in the rebuilding and change. Metropolitan areas are critical to better energy utilization; increased highway construction has extended metropolitan growth throughout the land, while amounts spent on public transit have been minimal. But in the 1970s this trend began to be reversed as auto use came to be discouraged in the face of high energy costs, environmental regulations and rising land prices. This is the essence of today's challenge. While the auto will continue to dominate, trips will be shorter and fewer, especially for shopping. Another expected trend is the revival of the big city, as changing land-use patterns will produce higher-density settlements. This has important implications for mass transit. Up till now, mass transit has been frequented primarily by the less privileged, a situation which reflects the population composition of inner cities. A suggestion is to reexamine transit pricing so that price and income elasticities can be accurately reflected, and to realize that physical improvements alone will not increase ridership. The article closes by reemphasizing the critical importance of transportation planning, since such decisions will have direct bearing on other socioeconomic constraints.

0470

Bernhardt, Kenneth L.
1979 Government and the Energy Conscious Consumer: The Appliance Energy Labeling Program.
In Karl Henion and Thomas Kinnear, eds., The Conserver Society. American Marketing Association.

Abstract: This paper presents an example of how marketing concepts and practices can be applied by government to motivate and facilitate energy conservation by consumers. It describes the proposed energy-labelling program of the U.S. government. Of 13 appliance categories delineated, labels are required for 4 categories where energy use is either high or varies between models. Labels contain the following information: estimated annual operating costs for comparable products; a qualifier (cost will vary depending on local rates and use); information about how the cost was derived; and a table showing how cost can vary with rates and usage patterns. A fear has been expressed that consumers will take the average figure shown on the label to be an accurate estimation of the actual cost, regardless of utility rates or usage. Several consumer research studies were conducted to assist in decisions as to the type and format of disclosure which should be mandated (see Response Analysis Corporation, 1977). The results of the program will have to be evaluated in the future.

0475

Bittle, Ronald G., Robert M. Valesano, and Greg A. Thaler
1979 The Effects of Daily Feedback on Residential Electricity Usage as a Function of Usage Level and Type of Feedback Information.
Journal of Environmental Systems, 9, 3, 275-286.

Objective: To analyze the differential effectiveness of four feedback types

Method: The experiment involved 353 families in a southern Illinois community and lasted for eight weeks in the summer of 1977. Initially all experimental households were randomly designated to receive one of four types of daily feedback (see Variables, below). After the groups were established, every fourth household in each group was assigned to a delay group. The delay group (N = 86) began receiving feedback 10 days after the primary group (N = 267). Electric meters were read daily, Monday through Saturday, over 58 days. After a 16-day baseline, the primary group began receiving feedback on July 2. Baseline for the delay group continued until July 11 (26 days). All feedback was discontinued on August 6 and was followed by a return to baseline conditions (reversal) until August 13 (7 days). Feedback periods spanned 35 days for the primary group and 26 days for the delay group. During baseline, subjects were identified as high (N = 107), medium (N = 117) and low (N = 129) consumers.

Variables: Dependent: electricity consumption

Independent: type of feedback: (1) number of kilowatt hours used during the previous day; (2) cumulative number of kilowatt hours used since the first of the month; (3) dollar cost of electricity used during the previous day; (4) cumulative cost of electricity used, month-to-date

Findings/implications: All groups increased consumption over baseline, caused probably by hotter weather during the feedback period. The largest increase over baseline occurred with the low consumer groups, and the smallest with the high groups. For high consumers, cumulative kilowatt was the most effective feedback (consumption increased 18%) and daily kilowatt the least effective (increase, 33%). Primary feedback groups did increase consumption less than the delay (control) groups during the 10-day period in which the delay group received no feedback. Feedback was provided for a short period, and temperatures were very high (several days above 94°F) during treatment. Feedback would appear to be effective, especially for high consumers. Cumulative type feedback is more effective than is a daily noncumulative type.

0480

Bittle, Ronald G., Robert M. Valesano, and Greg A. Thaler
1979 The Effects of Daily Cost Feedback on Residential Electricity Consumption.
Behavior Modification, 3, 2, 187-202.

Objective: To study the effects of feedback on residential electricity consumption

Method: Thirty families in a southern Illinois community participated in the experiment during the summer of 1976. After baseline consumption was monitored for 12 days, 42 days of feedback was provided to 15 families (Group A). During the final 24 days, feedback was provided to the other 15 families (Group B).

Variables: Dependent: electricity consumption

Independent: treatment (the feedback consisted of the number of kilowatts used and the cost for the previous day, and the cumulative cost of electricity used to date); temperature

Findings/implications: Results were analyzed in 3-day blocks. During baseline, Group A consumed more than Group B in 3 of the 4 blocks (by 8%, 3% and 2%). Group B consumed more than Group A during the first feedback period (A received feedback) in 12 of 14 blocks (differences ranged from 1% to 9%). During the period in which B received feedback, B's consumption was higher in 7 of 8 blocks (range 6% to 21%). Within Group B, the average daily consumption was 14% lower on days when feedback was received. Controlling somewhat for outside temperature (comparing only days within certain ranges), consumption decreased on average by 30% when feedback was given. The difference was greatest on days when the electricity required for cooling purposes was lowest, or when comfort was least affected.

0485

Bittle, Ronald G., Robert M. Valesano, and Greg A. Thaler
1978 Energy Conservation in a Large Mental Hospital. Administration in Mental Health, 5, 2, 154-161.

Objective: To determine if daily feedback to institution employees would produce reductions in electricity consumption

Method: The experiment was conducted in a midwestern state mental hospital during the summer of 1977. There were six resident halls, with two units per hall, housing 500 residents and employing 620 persons. Twenty posters were displayed throughout the hospital, providing feedback in the form of kilowatt and cost information. No feedback was provided for the first 13 days. For the next 14 days, the kilowatt feedback was posted, followed by the cost feedback for 34 days. During the final two weeks, no feedback was provided. A verbal questionnaire was administered to 61 employees at the conclusion of the experiment.

Variables: Dependent: actual electricity consumption, opinions about the feedback program, reported changes in behaviour

Independent: feedback information provided

Findings/implications: There was a high degree of variability in electricity consumption throughout the study. There were two days with extremely high consumption, but it appeared that neither the weather, the day of the week nor any other identifiable variable could account for the variability. The cost-information posters seemed to have a greater impact than the kilowatt-information posters on the employees. Over half of the technical staff members could estimate the cost information accurately, but less than 10% could estimate the kilowatt information. Most hospital employees were in a position that precluded any conservation behaviour. As well, they were not apt to be concerned with consumption because they were not paying for the electricity. Perhaps tangible rewards (cash bonuses) could be provided in large institutions to encourage energy conservation.

0490

Bixby, Ronald H., Thomas M. Corsi, and Michael A. Kocis
1980 Framework for Analyzing the 1979 Summer Fuel Crisis: The New York State Experience.
Preliminary research report for the Planning Research Unit, New York State Department of Transportation, Albany.

Abstract: This paper describes the efforts of New York State to develop a framework for analyzing the past experience of individual states and local areas in order to plan for appropriate responses to possible future emergencies. Reliable data on shortage levels, travel responses by the public and transportation resources are scarce and uncoordinated. The paper takes available data sources and provides a framework for integrating data with base-case control totals to develop a model of travel behaviour during the 1979 summer energy crisis in New York State. It is also shown how the framework could be utilized to measure the effectiveness of individual actions and overall responses by the public and government to substitute for the lack of mobility during energy crises.

0495

Blankenship, Douglas P.
1976 Segmentation Analysis of Transit Users and Nonusers. Transportation Research Record No. 590, Transportation Research Board, National Academy of Sciences, Washington, D.C., pp. 1-4.

Objective: To evaluate factors that influence the use of public and private transportation alternatives in the Orange County Transit District of California, with the purpose of devising ways to market public transportation now and in the future

Method: A stratified random sample of 1,800 households was subjected to in-home, personal interviews between June 28 and July 21, 1974. This sample size ensured a high level of statistical reliability.

Variables: Dependent: attitudes towards different travel modes, intentions to act

Independent: demographics: age, income, education, occupation, sex; travel behaviour

Findings/implications: Results were obtained for several different topics. (1) While the auto is perceived as being simpler to use and more convenient, the bus is regarded as safer, more relaxing and less expensive. (2) Younger people with more education and higher incomes are more inclined to believe that public transit has future potential. People between 18 and 24 are more transit receptive than all other age groups. (3) Those least concerned about the social status of bus-riding tend to be middle-aged, low-income consumers who use transit presently. Fare, distance from bus stop and frequency of service are major determinants of transit use. (4) The majority favour at least some federal subsidization. (5) Twenty per cent of all commuters feel they could easily use public transportation for work or, at most, find it slightly inconvenient. Those in lower-income groups are most likely to be transit dependent, and females are more likely to ride the bus than males. (6) The more drivers per household, the greater is the mobility of household members. (7) There is general awareness of transit service and the concept of dial-a-ride. (8) The response to and recall of advertising was fairly significant. These and other trends form decisive guidelines for future marketing programs designed to switch people from auto to transit, and it is vital that various appeals to these different subgroups be included in such strategies.

0500

Boddewyn, J.J.
1980 Energy and Advertising Regulation and Self-regulation in Thirty-nine Countries.
Prepared for the International Advertising Association, Inc.

Objective: This study is part of the Forbidden Advertising Project of the International Advertising Association (IAA), which deals with advertising practices where the element of prohibition and/or severe regulatory restriction predominates or is likely to increase

Method: A mail survey, conducted from November 1979 through February 1980, polled 325 IAA Chapters, advertisers, experts, lawyers and governments in 42 countries. Usable responses totalled 107.

Variables: Regulations governing the advertising of energy-consuming products (four-point scale from no special restrictions to advertising forbidden); assessment of future regulations

Findings/implications: The advertising of energy-consuming products has been little affected by regulations. More affected have been: (1) the promotion of energy products, and (2) energy-consuming advertising devices. In Brazil and France the advertisement of gasoline is expressly forbidden. Informal agreements in some countries restrict gasoline advertising. Labelling requirements for automobiles are becoming more common. A number of countries have energy-consumption labelling regulations for appliances, but few have advertising requirements as such. In general, it is anticipated that governments will continue to emphasize means other than advertising regulation to achieve their goals in energy conservation. Standardized labelling requirements will probably lead to the development of standardized advertising statements about energy consumption.

0505

Boretsky, Michael
1977 Opportunities and Strategies for Energy Conservation. Technological Review, 79, 8, 56-62.

Abstract: The conservation potential in the United States is estimated by an examination of the energy use in nine industrialized countries from 1960 to 1972. The potential is inferred from the relationships between energy consumption, gross national product (GNP) per capita and number of persons employed. It is estimated that, on the whole, the conservation potential is 21% of total energy used in the United States. In the industrial products sector, the potential is 40%, while for motor gasoline it is 37%. The 21% may be a conservative estimate. There are low negative correlations between per capita consumption of gasoline and price levels of gasoline (for the nine countries). Estimates of price elasticity during 1973-76 are -.14 for industry and -.07 for all other sectors. These estimates may be high. If they are accurate, price increases would have to be extremely large to achieve the full conservation potential (over 800% in the industrial sector). Such increases would contribute to increased inflation and unemployment, and thus be quite disruptive. What is required are policies that attack the inefficient users of energy directly and leave others alone.

0510

Bozinoff, Lorne
1979 A Multivariate Analysis of Attitudes Toward Solar Heating in Canada.
Presented at the Administrative Sciences Association of Canada 1979 Conference, the University of Saskatchewan.

Objectives: (1) To investigate Canadians' attitudes towards solar heating; and (2) to isolate factors likely to be related to differences in these attitudes

Method: Data are taken from a national mail survey conducted by Market Facts Ltd. A total of 1,203 questionnaires were completed. Respondents were part of the company's national consumer mail panel.

Variables: Dependent: attitudes re solar heating and energy conservation. Automatic Interaction Detection (AID) was used in the analysis, prior to the regression and discriminant analysis runs

Independent: demographics

Findings/implications: There are few differences in attitudes between French- and English-speaking Canadians. Age of husband was often significant in the determination of attitudes towards solar heating and energy conservation in general. Household income has a complicated relationship with the attitudes: for example, middle-income groups were much more willing to pay more for conventional heating than were either lower- or higher-income groups. No overall conservation attitudes were found.

0515

Brewer, Kenneth A., and Bernice H. Gray
n.d. Policy Preferences for Conservation of Transportation Energy in Case of Fuel Shortage.

Objective: To examine fuel consumption levels and public perception of the long- and short-term impact of policy alternatives

Method: A random sample of 2,323 households was selected from cities of fewer than 35,000 people in 59 Iowa counties. A questionnaire designed to measure individual preferences for policy alternatives was mailed to all sample households. A total of 1,398 useable questionnaires were completed. A trade-off analysis was used for the policy preference.

Variables: Dependent: preferences for policy alternatives

Independent: socioeconomic variables, various policy alternatives

Findings/implications: Immediately following the 1973-74 oil embargo, people indicated a preference for those policy alternatives which least affected their personal lifestyle, or which allowed them some personal freedom to choose the conditions under which to participate. Young people were most opposed to severe ration limits; high-income groups preferred the 88.5 km/h speed limit, as did the elderly. The authors conclude that in making future policy choices between the "tough" options of rationing and pricing, the issue is not which of the two is more acceptable philosophically to the public, but whether the resulting distribution of supply is perceived as acceptable to the household lifestyle.

0520

Bruce-Briggs, B.
n.d. Gasoline Prices and the Suburban Way of Life. Public Interest.

Abstract: The likely effects of future higher gasoline costs on the suburban American way of life are examined. Using Platt's Oilgram Price Service and federal statistics the author notes that, until quite recently, the price of gasoline had increased only slightly despite constant inflation and unparalleled income gains. (Most recent figures are for 1974.) It is indicated that in 1974, despite sharp increases, gasoline prices were relatively lower than in the early 1960s. The author concludes that American suburbanites will not be terribly hindered by increased gasoline prices and that both the spread of suburbia and the increase in numbers of automobiles are likely to continue despite the gasoline price increases.

0525

Brunner, Ronald D.

1980 Decentralized Energy Policies.
Public Policy, 28, 1, 71-91.

Abstract: Energy conservation policies initiated and managed at the local community level can make a significant contribution towards realizing national goals for energy conservation and conversion to renewable resources. Measures instituted by three communities — Davis, California, Seattle, Washington, and Springfield, Vermont -- are reviewed and analyzed. Policies made at the local level can more readily accommodate the diversity of local circumstances. A major motivating factor behind local energy initiatives has been the need to balance budgets in the face of increasing energy prices. A principal constraint has been the lack of policy guidance on a convenient and timely basis. Policy guidance may in fact be a more significant factor than external funding, at least initially. Federal energy policy should attempt to maximize the potential for energy conservation at the local level. Specifically, the Department of Energy could: (1) disaggregate national goals for energy conservation to local levels; (2) develop performance indicators for local policies; (3) fund experienced organizations to act as information clearing houses; (4) fund local governments with experience in energy conservation to document and distribute their actions; (5) require specific consumption data to be made available to individuals and communities; (6) provide grants for local energy programs; and (7) validate and publish information on programs. Many federal energy policies currently assume that price mechanisms can stimulate action towards energy conservation. Local energy policies can ameliorate attitudinal and institutional barriers and therefore increase the effects of price manipulations.

0530

Brunner, Ronald D., and Weston E. Vivian
1980 Citizen Viewpoints on Energy Policy.
Policy Sciences, 12, 2, 147-174.

Objectives: (1) To explore citizen viewpoints and their interaction with elite perspectives in the energy policy process; and (2) to suggest the need to rethink energy policy planning as a means of coping with subjective differences

Method: In April 1979, 101 citizens (nationwide) were interviewed. A technique known as the Q-technique was used to discover the number and content of shared viewpoints. Respondents sorted 48 statements according to relative intensity and direction (agree vs. disagree). Respondents were grouped into four clusters on the basis of shared viewpoints. Representatives of the clusters were interviewed, in depth, in the summer of 1979.

Variables: Dependent: attitudes and opinions on a variety of energy-related topics

Independent: demographics

Findings/implications: Respondents in the largest of the four clusters (the core) generally objected strongly to new nuclear plants in their area, expressed substantial support for solar energy, felt that energy prices were not too low, disagreed that energy suppliers deserved their trust, felt that politicians and suppliers lacked credibility, and had a demand for better information regarding how the energy crisis would affect them and what to do about it. People were more concerned with those aspects of the energy situation that pertained to the immediate circumstances of themselves or others like them. They also tended to rely on their own personal observations and interpretations. Those most strongly antinuclear and proenvironment were also the most highly educated. Those with the most idosyncratic viewpoints were the less educated and more elderly. Health, safety and environmental concerns have intensified relative to others over time. Regarding nuclear power, the attitude has shifted towards opposition (the Three Mile Island incident occurred only weeks before the initial data collection phase). Anxieties and insecurities about energy lead to "scapegoating" -- responsibility and blame are focused on government and business, and statements from those sources are discounted. A decentralized strategy may be needed to overcome the existing perceptual and political barriers and achieve positive results.

0535

Bush, James R., and Robert E. Stevens
1980 Tulsa Talks About the Gas Crisis.
Business Horizons, 23, 2, 31-35.

Objectives: (1) To study consumer reactions to the current energy situation; and (2) to identify emerging trends in consumer behaviour related to gasoline consumption

Method: One hundred telephone interviews were conducted in Tulsa during October 1979.

Variables: Dependent: assessment of energy crisis, adjustments in gasoline consumption, intentions to purchase automobiles

Independent: demographics

Findings/implications: More than 50% of the respondents believed that the gasoline shortage was caused artificially. Believers tended to be younger, better educated, of higher incomes and male. Blame was placed on government and the oil companies. Seventy-eight per cent claimed to have reduced gasoline consumption in the last year. Almost half said that the shortage had affected vacation plans (38% of those stayed home, and 31% vacationed closer to home). Most (77%) believed that the availability of gasoline would remain constant or increase. Most (85%) felt that the price of gasoline would rise. Many consumers expressed an intention to buy a smaller car.

0805

Cabrera, Dianne, and David T. Hartgen
1980 An Assessment of Games as Methods of Providing Information on Gasoline Conservation.
A Preliminary Research Report for the Planning Research Unit, New York State Department of Transportation, Albany.

Objective: To investigate the potential of informal game-type methods of informing conservers about transportation energy conservation

Method: An informal survey was taken of game participants (from seven to ten participants in each of four games) in March 1980 after the playing of one of the four games.

Variables: Dependent: level of energy-conservation knowledge

Independent: the game

Findings/implications: Despite the limited sample size and other methodological issues, the authors conclude that informal game-type methods can be quite effective as educational devices for energy consumers. It is suggested that the games could be incorporated in classroom activities, in driver education courses or as a newspaper supplement.

0810

Cain, William S., et al.
1979 Ventilation and Odor Control: Prospects for Energy Efficiency.
Prepared by Lawrence Berkeley Laboratory for the U.S. Department of Energy.

Abstract: Dealing primarily with technical features of ventilation and the control of odorous contaminants, this report pursues a dual goal: maintaining acceptable air quality indoors and achieving energy efficiency in the maintenance of air quality. Reduction in the amount of ventilation normally necessary to control odours will reduce the amount of energy consumed to heat, cool or dehumidify the air. The most direct way to decide ventilation requirements is to perform psycho-physical experiments. Five issues of particular importance include: (1) the need for higher ventilation rates per person under crowded conditions; (2) the stability of various odorous contaminants after removal of the source; (3) the role of temperature and humidity in the generation and perception of odorous contaminants; (4) the possibility that indoor air cleaning via filtration can eliminate the need for high quantities of ventilation air and thereby save energy; and (5) whether results obtained in an ideal system will generalize to a field situation.

0815

California Energy Commission
1979 California Load Management Research 1978.
Report to the Department of Energy by the California Electric Utilities Demonstration Project.

Objective: To describe the progress and results achieved during the second year of the Department of Energy/California Energy Commission Electric Utilities Demonstration Project

Method: The project involves a number of studies and experiments: (1) commercial end-use, (2) industrial end-use, (3) agricultural end-use, (4) statewide residential customer attitude survey, (5) time-of-day (TOD) pricing experiments, (6) appliance load cycle analysis. Results presented in this report pertain mainly to the time-of-day rate and appliance load control experiments. During 1977, 270 large commercial and industrial customers of three utilities were subjected to TOD studies. Four different air conditioner cycling experiments that vary cycling strategies and control equipment were initiated in 1976.

Variables: Dependent: impacts on peak-load energy use, customer response to load controls, attitudes towards participation in load management, preferences for load management alternatives

Independent: load management treatments

Findings/implications: Preliminary results from the commercial TOD experiments suggest that: (1) TOD rates were effective in slowing the growth of peak-load demand; however, the reduction actually attributable to TOD rates is not known; (2) individual customers are affected in varying degrees -- industrial users can modify consumption patterns more than commercial users can; and (3) more study is needed re the selection of rating periods and the allocation of costs. The residential air conditioning cycling experiments indicated that: (1) average peak-period reductions appeared to be proportional to the cycle-off time; (2) noncoincident maximum demand during the peak billing period was reduced 150%-200% as much as the reduction in average demand; and (3) air conditioner loads increased in the hours immediately subsequent to the cycle. Customers showed strong acceptance of cycling programs. Over 86% were willing to participate in the second year of the program. Those on longer off-cycles were less willing to participate a second year. The most-preferred load management alternative was load sharing, followed by TOD pricing, emergency curtailment

California Energy Commission (cont.)

(air conditioner, water heater), mass media appeal, curtailment (all appliances) and building more power plants. Those who had experienced load sharing were more receptive to it. The agricultural experiments showed that load management could be feasibly utilized in agriculture.

0820

Canadian Facts
1979 A Survey of the Public's Attitudes Toward the Energy Situation Volume I.
Prepared for Energy, Mines and Resources Canada.

Objective: To examine the public's energy-related concern, attitudes, knowledge, behaviour and reactions in terms of general policy alternatives

Method: Telephone interviews were conducted with heads of households in eight Canadian cities during March and April 1979. Total interviews completed numbered 1,654.

Variables: Dependent: level of concern re the energy situation, attitudes towards energy conservation, energy-conserving behaviour, knowledge of energy conservation behaviour, reactions to energy-related policies

Independent: demographics, region of residence

Findings/implications: Seventeen per cent mentioned energy as a problem which should be of concern to Canadians. The cost of energy is perceived by more people as being a serious problem than are possible energy shortages (80% vs. 59%). Those living in eastern Canada are generally more concerned. Almost 40% believed that the energy crisis is a hoax created by government and business. Only 18% felt that technology will solve the problem. Almost 75% said that they could reduce energy use without too much difficulty. Most (92%) felt that individual efforts can be very/somewhat important in conserving energy. Support for various policy measures ranged from taxes on heating fuels, electricity and gasoline (22%), rationing those energy supplies (25%), fines for excessive energy use (29%), taxes on gas-guzzling cars (55%), to energy labels (87%), advertising (84%), subsidies to improve transit (81%), and expanding insulation grant programs (85%). Energy-conserving behaviour reported included: keeping thermostat lower (71%), having furnace serviced (79%), driving less (43%), buying a smaller car (27%), participating in carpools (29%), using public transit more often (40%).

0825

Cannon, Lisa

1981 U.S. Energy Conservation: Federal and Community Actions. In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 170-179.

Abstract: The paper examines some of the conservation programs initiated by the Department of Energy, as well as some significant nonfederal conservation projects. A major barrier to conservation is the conviction that conservation is not possible without lowering the standard of living. National conservation policies affecting all consumers include tax credits for conservation improvements. Appliance-efficiency and fuel-efficiency standards have been established, as well as improved building code regulations. Various federal programs provide grants to state and local governments for the establishment of programs, regulations and laws. Included are the State Energy Conservation Program, the Energy Extension Service (a program which tested delivery systems of energy information and actual energy use training), and the Community Conservation Energy Management and Partnership Act (proposed only). Some of the most innovative projects have sprung from local inspiration and necessity, for example, St. Paul, Minnesota's, Energy Mobilization; the Portland, Oregon, Energy Conservation Project; and the Fitchburg, Massachusetts, Action to Conserve Energy. The best community programs combine some of the following elements: (1) broad representation from the community, (2) substantial self-reliance within the community, (3) leveraging money from several different sources, and (4) strong consciousness-raising efforts. The programs have pointed out that there are many areas of research left to pursue, and barriers to conservation which are not well understood. Future policy and programs must involve all three levels of government, but the impetus may have to be from the local level.

0830

Carlson, Lynda, et al.
1981 Residential Energy Surveys by the U.S. Department of Energy. In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 131-140.

Objectives: (1) To describe the evolutionary development of residential energy consumption surveys in the U.S. Department of Energy; and (2) to describe the use of the data collected in the National Interim Energy Consumption Survey (NIECS)

Method: For the NIECS, personal interviews were conducted with 4,181 of 4,507 contacted households beginning in October 1978. Fuel consumption data were collected from the relevant energy suppliers. Transportation data were gathered on a panel (N = 500) basis, with respondents maintaining vehicle use logs for two-month periods.

Variables: Dependent: energy consumption and expenditures

Independent: housing unit, energy-related characteristics, household vehicles, household characteristics, climate

Findings/implications: Households which used fuel oil for space heating exhibited significant conservation charges. Over 1978-79, 7% switched to another heating source and a significant proportion added insulation, storm windows, etc. Average household consumption was higher in the northeast and north central regions of the United States. The larger the house, the more energy was consumed. The type of structure (single vs. multiple family) also affected the amount of energy consumed. The data from the NIECS are being used for a range of policy implementations. Surveys will continue on a smaller scale but more frequent basis.

0835

Carlyle, Jamie J., and E. Scott Geller
1978 Behavioral Approaches to Reducing Residential Energy Consumption: A Critical Review.
Working paper, Department of Psychology, Virginia Polytechnic Institute and State University.

Abstract: A critical review is offered of the research designs, interventions, results, conclusions and cost-effectiveness of 33 behavioural studies which examined the application of behavioural principles to energy conservation. The studies that investigated the congruency between energy-related attitudes and behaviour found, as a general conclusion, that the two are not commensurate. Interventions used to influence reductions in electricity and natural gas consumption have manipulated both antecedents and consequences of particular consumption responses. The antecedent interventions have included prompting (e.g., instructions, pamphlets, pleas), contingency contracting (monetary rewards for meeting specific goals), goal setting (for consumption reductions). Consequential interventions have included performance feedback, social commendations for reductions in energy usage, and self-monitoring of consumption. The application of monetary incentives, goal setting, performance feedback, social commendation and self-monitoring have decreased energy consumption. Information prompts have been more limited in effectiveness. Several studies have proven to be cost-effective. Suggestions for future research include implementing conservation programs using smaller and more cohesive groups, providing residents with more detailed information on specific target behaviour that can be changed to bring about decreases in energy consumption and developing approaches which combine several audiences, strategies and targets.

0840

Carolina Power & Light Company
1979 Appliance Information Study.
Carolina Power & Light, Raleigh, N.C.

Objective: To update information on appliance saturation and usage

Method: No information on the survey method was available.

Variables: Appliance saturation; fuel use; dwelling characteristics; familiarity with the Carolina Power & Light (CP&L) program of providing conservation tips; conservation behaviour; energy-saving devices installed in-home; intentions to consume under time-of-day (TOD) pricing (lower rates, 10:00 p.m. to 10:00 a.m.)

Findings/implications: Saturation levels of various appliances for 1979 and 1970 were: window air conditioning, 33% and 35%; central air conditioning, 35% and 13%; freezer, 53% and 44%; electric dryer, 51% and 23%; dishwasher, 29% and 12%; and colour TV, 69% and 30%. Heating fuel usage levels for 1979 and 1965 were: electricity, 31% and 8%; natural gas, 12% and 5%; oil, 39% and 61%; and coal, 1% and 8%. Over 80% reported satisfaction with the electric service (ranged from 77% to 88%, 1972-1979). Almost 80% reported that they were familiar with CL&P's program of providing conservation tips. Many (73%) said they would transfer usage to past 10:00 p.m. if TOD rates were in effect. Appliances most likely to be used past 10:00 p.m. included: washer/dryer, 65%; hot water, 49%; dishwasher, 32%; and television, 30%. Twenty-six per cent reported either having added insulation in the past year or planning to do so in the ensuing year, while 35% reported installing storm doors/windows.

0845

Caves, Douglas W., and Laurits R. Christenson
1980 Effects on the Residential Load Curve from Time-of-Day Pricing of Electricity: Econometric Inferences from the Wisconsin Experiment for Summer System Peak Days.
Social Systems Research Institute, University of Wisconsin-Madison.

Abstract: The goal of this analysis is to estimate the change in the shape of the residential load curve as a result of time-of-day (TOD) pricing. An econometric methodology is applied to the data of the Wisconsin TOD experiments for July and August 1977 and 1978. The analysis addresses three areas: (1) shifting of the load on days of system peak; (2) response to TOD pricing during hours when system peak is likely to occur; and (3) distribution of the usage shifted to off-peak periods. Results of the analysis suggest that: (1) the elasticity of substitution of peak to off-peak consumption is not significantly different from that for other weekdays; (2) the percentage response at peak hours may in fact be greater than it is at other hours during the peak periods; and (3) usage shifted to off-peak periods is not disproportionately distributed. In summary, these three conclusions concerning TOD pricing do not have any empirical support from the Wisconsin experience.

0850

Caves, Douglas W., and Laurits R. Christenson

1980 Econometric Analysis of Residential Time-of-Use Electricity Pricing Experiments.

Social Systems Research Institute, University of Wisconsin-Madison.

Abstract: A methodology is proposed whereby the neoclassical theory of consumer behaviour can be employed to analyze the responses of consumers to experimental time-of-use electricity prices. The methodology is illustrated by the use of three alternative representations of consumer preferences — the CES, translog and generalized Leontief models. The translog model is unsuitable when the partial elasticity of substitution between peak and off-peak electricity consumption is sufficiently small. The other models are suitable, though the generalized Leontief becomes the preferred when there are more than two time periods. Data from the Wisconsin experiments suggest that partial elasticities of substitution are small but statistically significant for peak periods of 6, 9 and 12 hours in length. Other findings suggest that peak and off-peak electricity consumption are complements with respect to the consumer's total income.

0855

Caves, Douglas W., and Laurits R. Christenson
1979 Residential Substitution of Off-Peak for Peak Electricity Usage under Time-of-Use Pricing: An Analysis of 1976 and 1977 Summer Data from the Wisconsin Experiment.
Social Systems Research Institute, University of Wisconsin-Madison.

Objective: To document the methodology, procedures and conclusions from the first phase of an econometric analysis of the Wisconsin Time-of-Use (TOU) Electricity Pricing Experiment

Method: Data collected in July and August 1976 and 1977 are used in the analysis. The experiment involved three peak periods (6, 9 and 12 hours) and a number of price ratios.

Variables: Dependent: ratio of peak to off-peak consumption

Independent: peak period, price ratio, consumption category (low, medium, high), appliance stock, household characteristics

Findings/implications: The basic model indicates that an increase in the peak to off-peak price ratio produces a decrease in the ratio of peak to off-peak consumption. By way of example, the predicted ratio of peak to off-peak consumption for the six-hour peak in August falls from .224 to .203 as the price ratio goes from 1:1 to 2:1. Analysis yields similar elasticities of substitution for all levels of consumption. The ownership of major appliances generally increases the ratio of peak to off-peak consumption, and in general the ownership of appliances increases the response to TOU pricing. Households with more adults and more children have lower peak to off-peak consumption ratios, and those households with more people at home during the day have higher ratios. Evidence suggests that an overall summer elasticity can be used to represent all peak periods in both months. The overall estimated elasticity of substitution is .117. Predicted ratios for various price ratios are presented.

0860

Chandler, Margaret, et al.
n.d. The Effects of Simple Social and Competitive Social Feedback on Energy Consumption in College Dormitories. Unpublished manuscript, University of North Carolina at Greensboro.

Objective: To explore the effectiveness of simple social feedback and competitive social feedback in reducing the energy consumption of a college dormitory

Method: The study involved six all-female dormitories. Consumption was monitored for a five-day baseline period, and then two treatments were instituted. In the first treatment, information on appliance energy consumption was supplied through posters, and feedback through poster graphs which compared consumption to baseline. In the second treatment, the same information was provided. In addition, each dorm was asked to compete with another, and feedback was supplied on consumption relative to that of the competitor.

Variables: Dependent: electricity consumption

Independent: treatment

Findings/implications: Dorms receiving competitive social feedback achieved an average reduction of 11.8% from baseline, and those receiving simple feedback reduced consumption by 5.6%.

0865

Chapman, Duane, Timothy Mount, and Timothy Tyrrell
1973 Modeling Electricity Demand Growth.
In Energy Modeling: Art, Science, Practice (working papers for a seminar on energy modeling, Jan. 25-26, Washington, D.C.).

Objective: To estimate the future electricity demand for the residential, commercial and industrial sectors

Method: A model is developed which takes into account the influence of several economic and demographic factors on electricity demand. The model is estimated by ordinary least squares, using both cross-sectional and time-series data. Both short- and long-run elasticity estimates are yielded for each of the independent variables, and three studies by other researchers are discussed and compared along similar lines.

Variables: Dependent: consumption

Independent: population growth, income, electricity and natural gas prices, electricity demand

Findings/implications: Projections of electricity consumption using Chapman's model are noticeably lower than regional and national estimates currently in use. The authors contend that demand estimates of other researchers and government agencies are too high, even though past projections have been quite accurate. The different findings are due to the influence of several causal factors. Respective elasticities show that the most important determinant is electricity prices, followed in order by population growth, income and finally gas prices. Regarding future demand growth, population assumptions do not appear to be important.

Important questions arise regarding future energy research and development strategy and environmental protection strategies. Assuming that growth is less than presently estimated, it will become essential to know the effect on material living standards, especially of low-income groups.

0870

McDougall, G.H., J. Brent Ritchie, and John D. Claxton*
1981 Analysis of Consumer Energy Consumption.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 11-22.

Objectives: (1) To provide a baseline description of energy consumption in a cross-section of Canadian households; and (2) to assess the relative importance of a range of factors which may explain household energy consumption

Method: A national panel was surveyed; 2,366 of 3,000 households contacted returned questionnaires. Actual energy use was obtained from utilities: electricity (N = 1,265), natural gas (N = 479), fuel oil (N = 380). Gasoline usage data were self-reported.

Variables: Dependent: annual energy consumption (home heating, electricity, auto gasoline)

Independent: climate; house/appliance/vehicle characteristics; household demographics; attitudinal variables

Findings/implications: The highest energy consumption per household was in Alberta, and the lowest in the Atlantic provinces. In-home differences may be accounted for by the following variables: degree days, house size, house shape, presence of electric heating, family size, income, presence of a fireplace, thermostat setting. Gasoline usage differences may be accounted for by number of vehicles, mean vehicle weight, age of vehicle, miles driven, number of drivers in household, age. Income does not appear to be a significant prediction of consumption. The association between attitude/lifestyle variables and consumption is not clear. Conservation programs concentrating solely on attitudes are likely to do little to encourage conservation. Programs aimed at improving the energy efficiency of the housing stock should receive top priority. Gasoline usage can best be altered by increasing vehicle efficiencies and providing alternative modes of transportation.

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*This abstract (and the assigned code number) was prepared from the original working paper, on which the sequence of authors began with Claxton.

0875

Claxton, John D., and C. Dennis Anderson
1980 Energy Labels for Appliances.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 180-192.

Objectives: (1) To relate energy labelling to consumer behaviour research; (2) to report on a major field experiment involving refrigerator sales; and (3) to discuss future labelling efforts in terms of major barriers that mitigate against consumer choice of energy-efficient products

Method: The experiment (2 x 2 design) took place at 18 stores in western Canada. Twelve stores were assigned to four treatments and 6 were monitored for control purposes. A postpurchase mail questionnaire was sent to buyers (N = 303).

Variables: Dependent: model chosen (in terms of frost free vs. manual defrost, refrigerator size and energy "status"); awareness of energy information; salience of energy information in choice

Independent: information type: kilowatt hours vs. dollars; sales force emphasis: no emphasis vs. emphasis

Findings/implications: Four major barriers to energy-efficient choice are gleaned from the research: (1) consumers' limited cognitive capacity and associated limited search patterns increase the difficulty of attracting attention to and usage of energy information; (2) energy information will have a low probability of being noticed and used unless it has high salience relative to other purchase considerations; (3) because of the dominant role of retail salespeople in consumers' appliance purchases, energy information will have a low probability of impact unless it has sales staff support; (4) energy-efficient choice will be less probable unless energy-efficient models are stocked and promoted by producers and retailers. In-store or mass media communications are needed to help consumers recognize and understand energy labels. The issue of energy information salience requires further research. Energy-labelling programs require careful monitoring and assessment to be effective.

0877

Claxton, John D., and C. Dennis Anderson
1981 Producer, Retailer and Consumer Perspectives on Canada's Energy Labeling Program for Major Appliances. Prepared for Consumer and Corporate Affairs Canada.

Objectives: The study had three major objectives regarding the impact of the ENERGUIDE program: (1) to interview manufacturers to assess the impact in terms of product changes and energy-related promotional emphasis; (2) to interview retailers to assess the impact in terms of products carried and energy emphasis by retail salespeople; and (3) to interview consumers to assess the impact on awareness, attitudes and behaviour regarding appliance energy-usage information.

Method: (1) Information from manufacturers: personal interviews were conducted with a dozen officials from six Canadian appliance manufacturing companies. The interviews were conducted during November and December 1979. (2) Information from retailers: telephone interviews with retailers across Canada were conducted in February and March 1980. (3) Information from consumers: in the fall of 1980 (two years after the introduction of ENERGUIDE labels on refrigerators) 1,467 questionnaires were mailed out and 583 (40% response rate) were returned.

Variables: Dependent: various measures of the impact on manufacturers, retailers and consumers

Independent: the ENERGUIDE label

Findings/implications: The study of Canada's appliance producers indicates that:

- because Canadian producers have strong organizational ties to U.S. producers, there appears to be a potential for the generally more energy-efficient U.S. appliance designs to be incorporated into Canadian appliance production;
- evolutionary changes in buyer tastes and competitive marketing strategies must be taken into account in any evaluation of the impact of ENERGUIDE on producer decision making;
- the mix of models sold by individual producers should be monitored to determine shifts in fleet energy consumption over time;
- producers are designing and introducing more energy-efficient refrigerators due, at least in part, to the implementation of the ENERGUIDE disclosure requirement;

Claxton, John D., and C. Dennis Anderson (cont.)

- further improvements in the energy efficiency of refrigerators and freezers can be expected in the near future;
- most manufacturer and retailer brochures mention energy-saving features, but only rarely are actual energy-consumption ratings listed;
- there is little industry-government agreement on the costs associated with ENERGUIDE program compliance;
- the location of the ENERGUIDE label on the outside of appliances results in a higher in-home removal rate than does an inside location; and
- the issue of in-home variances in appliance energy use is unresolved and should be studied.

The study of appliance retailers indicates that:

- few consumers ask about appliance energy consumption;
- retailers often could not correctly identify their most energy-efficient refrigerator model in a given size and style category;
- only about one-half of appliance department managers have discussed energy-consumption information in their sales meetings, and only about one-sixth of sales presentations to customers have had this emphasis;
- about one-fifth of retailers have media ads that include energy information;
- though most retailers feel ENERGUIDE should be extended to other major appliances, there is no majority consensus on a number of other specific ENERGUIDE-related issues;
- comparisons by region and store type indicated only limited variations;
- 36% had received the ENERGUIDE retail display, and 13% had used it when talking to customers;
- 28% had copies of the ENERGUIDE Directory available for use with customers;
- while 65% preferred no change in label location, 29% preferred moving the label to the outside of the door.

The study of consumers indicates that:

- 74% of refrigerator buyers and 83% of freezer buyers reported seeing ENERGUIDE labels when shopping for their appliances;
- over 60% considered the labels to be understandable;
- 29% and 43% of refrigerator and freezer buyers, respectively, indicated that the kW·h rating was a major factor in their purchase choice;

Claxton, John D., and C. Dennis Anderson (cont.)

- freezer buyers were more aware and made greater use of energy information than refrigerator buyers; and
- over the period covered by the 1978 and 1980 consumer surveys, label awareness increased from 33% to 77%, label usage from 10% to 22% and purchase of manual defrost from 9% to 17%.

0880

Consumers' Association
1980 The EEC Energy Labels for Domestic Appliances: A Pilot Survey of Consumer Understanding.
Prepared for the Department of Trade (U.K.).

Objectives: (1) To test the methodology for investigating consumer reaction to different ways of presenting energy consumption on labels attached to domestic appliances; and (2) to evaluate the effectiveness and usefulness to consumers of the European Economic Community (EEC) energy label

Method: Four versions of the label were tested in two London stores on washing machines. The labels were tested separately over a five-day period until 10 people for each label version were recruited for an in-home interview. Short interviews (N = 47) were conducted in the stores, while longer interviews (N = 32) were subsequently conducted in-home.

Variables: In-store: intention to buy washing machine, criteria determining choice of machine, visibility of labels

In-home: awareness of energy crisis; appliance ownership; evaluation of labels: (1) kW·h per cycle, (2) kW·h per cycle on chart showing usual range of consumption for washing machines, (3) kW·h per month (five wash cycles per week), (4) estimated average cost per cycle

Findings/implications: Three-quarters of those surveyed were definitely going to buy a washing machine within six months. Personal advice of friends/relatives played an important part in appliance choice. The major criteria determining choice were size (mentioned by 21 respondents), spin speed (15), price (15), performance (11), reliability (10), and electricity consumption (4). Only 11 people noticed the labels, and 6 of them found the information useful. Energy was ranked third on a list of national problems. However, electricity prices ranked first on a list of serious problems facing the respondent personally. In numerical order, label evaluations were as follows: (1) 26/32 found the label useful, though more were interested in noise levels than energy consumption; one-third did not know what kW·h meant; (2) 28/32 judged this label the worst of the four because it was too complicated; (3) 19/32 felt this label was worse than (1); over half did not understand what the small print on the label meant; (4) 27/32 judged this label the best of the four, mainly because the information in money terms was easier to understand. A well-planned campaign will

Consumers' Association (cont.)

be needed to help make energy labelling intelligible to consumers. The information must be presented to consumers so they can study it at leisure in their homes. Further research is needed to investigate the impacts of energy labelling.

0885

Consumers' Association
1979 Test Methods for Measuring Energy Consumption of Domestic Appliances: Consideration of Consumer Usage.
Report submitted to the Department of Energy (U.K.).

Objective: To assess the standard test methods used for measuring energy consumption of appliances, for the purposes of energy labelling, to determine if they adequately reflect consumer usage

Method: Test directives for refrigerators and freezers, dishwashers and washing machines are compared to those used in the Consumers' Association laboratory and to actual usage, as documented in various studies.

Variables: Dependent: electricity consumption

Independent: parameters for tests, actual behaviour patterns

Findings/implications: There is limited information available about the influence of consumer usage on energy consumption of refrigerators and freezers. Tests should be conducted to measure the effects of door openings, the temperature of food and amounts of food on energy consumption, as well as the effects of ambient temperature and relative humidity. There is some question about whether or not automatic defrosting refrigerators use more energy than the manual defrost units. Information on dishwashers' energy labels should relate to the cycle which is more likely to be used (intensive vs. normal). Tests should also be conducted on the effects on energy consumption of different types of crockery. The comparison of energy consumption between washing machines should not be divorced from a comparision of washing performance. There is little evidence of the effect of differences in use of washing machines on energy consumption. Test methods for measuring energy consumption for the purposes of energy labelling should reflect consumer usage. Further work should be carried out to obtain information regarding the impact of consumer usage.

0890

Contemporary Research Centre
1979 Report of a Study of Customer Attitudes Towards Residential Load Control — Phase I of a Research Program. Prepared for Ontario Hydro.

Objectives: To investigate the attitudes of residential Ontario Hydro customers in relation to: (1) the concept of load control, with reference to likely effectiveness and preference vis-à-vis time-of-day pricing, voluntary reduction and off-peak storage heating; and (2) the propensity to participate in a control program affecting certain appliances

Method: Group discussions were first held to aid in the formulation of a structured questionnaire. A sample of 500 (out of all households with metered electricity supply) was selected from across Ontario and interviewed in-home during the spring of 1979.

Variables: Dependent: opinions about electricity availability, conservation, costs and pricing perceptions re peak loads; attitudes re effectiveness of appliance load control, voluntary reductions, and time-of-day pricing; reasons for acceptance/rejection of the three options; rated effectiveness of incentives to participate in load control programs; effect of incorporating an override switch on willingness to participate; propensities to participate in specific control programs under various scenarios

Independent: demographics, size of hydro bill

Findings/implications: Most residents (78%) believe there is plenty of electricity available, but 95% also think everyone should make a real effort to conserve electricity. Ontario Hydro was not viewed favourably in regards to pricing, efficiency and its monopolistic position. There is widespread awareness of winter peak-load periods. Time-of-day pricing is perceived to be most effective and is reasonably well-liked. Load control is disliked, while voluntary reduction is well-liked but considered ineffectual. Monetary incentives are likely to be more effective in "selling" load control than any appeals to social responsibility or to the social conscience. A manual override switch may be more effective than any formal incentive in encouraging acceptance of load control. Load control on specific appliances with no provisos or conditions is rated on the negative side of a seven-point scale. There are few variations among subgroups in terms of their acceptance. Those older than 50 generally accept load control to a greater extent than do younger people. There is a clear correlation between

Contemporary Research Centre (cont.)

unwillingness to participate and the belief that load control conflicts with the idea of individual liberty. Anything that reduces this perceived loss of freedom would help encourage acceptance of load control.

0895

Cooper, Mark N.

1980 Energy Efficiency Investment in New Single-Family Residences: Conceptualization of Market Inhibitors and Policy Responses. Prepared for the 1980 Summer Study on Building Energy Efficiency Santa Cruz, Calif.

Abstract: This paper: (1) provides an overview of the market process in which new residences are created, (2) analyzes the decision-making processes inherent in choosing the level of energy efficiency to be incorporated into a new residence, (3) identifies policy options to promote more rapid incorporation of energy efficiency in single-family residences, and (4) presents a strategy for utilizing the conceptual framework in policy debates. The market has not produced the optimal energy-efficiency outcomes, and the fault may lie with consumers, producers or intervening forces. There are four fundamental policy positions with respect to the market: (1) pure: market is working or will work in short order; (2) freed: it will work once intermediaries get out of the way; (3) assisted: given help, it will work; and (4) regulated: it will not work without mandated behaviours. Forces affecting consumer behaviour include: (1) the decision-making process (infrequency of decisions, ambiguity of feedback, acquisition costs of information); (2) individual tastes; (3) individual economic circumstances; (4) investment preferences; (5) societal economic conditions (historically low price of energy, uncertainty about future energy prices and technology); and (6) societal information conditions. Similar forces affect producer behaviour. Policy options that can be applied to combat these market inhibitors include: (1) incentives/disincentives: decontrol of fuel prices, use/import taxes, inverted rate structures, various tax credits and subsidies; (2) information: developing technology, disseminating to users, educating the public, regulating certain standards. Existing pricing policies are a major contributor to inhibiting energy conservation investment. Regarding technology, the major problem may be in its dissemination in applied form to builders/producers.

0900

Corney, William J., John E. Nixon, and Betty Yantis
1981 Centralized Electricity Control.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 224-230.

Objective: To present the results of an ongoing attitude measurement and experimental residential air conditioning load management program

Method: In 1977, 270 homes were surveyed; of these, 50 were selected to take part in a load measurement program. As a result, a management study was initiated in which 5,000 customers were surveyed and 911 returned usable questionnaires. A total of 199 customers actually participated in the study, with usable data obtained from 161. A remote control device allowed the utility company to shut off the participant's air conditioner for certain lengths of time.

Variables: Dependent: willingness to participate in management program; reactions to energy management: discomfort, awareness of interruptions

Independent: opinions re energy problems, treatment

Findings/implications: Reactions were generally favourable with regard to perceived comfort. Consumer attitudes toward the effect of the device on their unit were also favourable. A higher proportion (53%) of those contacted in 1979 were willing to participate in a management program than in 1977 (40%). A substantial percentage of total residential customers could be expected to volunteer if an effort were made to implement a program for all customers. Volunteers were more aware of energy problems, lived in larger, newer homes and had larger families. For programs to be successful, they must maintain long-term participation. Energy conservation alone may not be reason enough to maintain the participation level.

0905

Cornille, Thomas A., Karol S. Oransky, and Ruth Pestle
1979 Changing Family Lifestyles: Adapting to the Energy Crisis. Journal of Home Economics, Winter, 36-37.

Abstract: The authors assert that the American family's failure to respond to exhortations for voluntary energy conservation can be understood in light of past research on the family's adaptation to crises. People do not change immediately when confronted with a crisis; rather they respond through a series of stages starting with shock or denial. The paper describes several recent articles that support this claim and concludes with an analysis of the role that home economics research could play in determining how the family can and does adapt its lifestyle to face energy crises.

0910

Corsi, Thomas M., and Milton E. Harvey
1977 Energy-Crisis Travel Behavior and the Transportation Planning Process.
Transportation Research Record No. 648, Transportation Research Board, National Academy of Sciences, Washington, D.C.

Objectives: (1) To study the adjustment strategies adopted by individual households in response to situations of real and potential fuel shortages and higher fuel prices; and (2) to determine the attitudes of individual households towards regional policies to deal with existing or prospective transportation facilities and costs

Method: A mail questionnaire was distributed in November 1975 to a random sample of southeastern Wisconsin households. There were 1,461 usable questionnaires returned.

Variables: Dependent: attitudes towards strategies, responses to strategies

Independent: demographics, socioeconomic variables, various conservation strategies

Findings/implications: The main finding was that moderate and gradual increases in fuel prices are unlikely to cause significant modifications in household travel patterns. During the energy crisis of 1973-75, over three-quarters of the sampled households adopted some form of travel behaviour strategy entailing distance-related and behavioural changes. Households preferred those adjustment strategies which entailed the least disruption of their precrisis travel behaviour. Over 40% of the sample made changes in recreation behaviour. Residential relocation as a response to the crisis was rare. Only 9% of the respondents indicated no change in travel behaviour in response to the crisis of 1973-75. Respondents indicated that gasoline rationing would have a far more substantial impact on their mode choice for travel to work than would a price increase of $0.05/L ($0.20/U.S. gal.). It was found that, in response to the 1973-75 crisis, households with younger heads were more likely to change their journey-to-work behaviour, to make distance-related shopping changes and to relocate closer to employment. Behavioural shopping changes, distance-related recreation changes, carpooling, the purchase of a new small automobile and the trade-in of a larger for a smaller automobile were more common among middle-class households.

0915

Costle, Douglas M.
1979 Scarcity as an Intellectual Resource: Notes on the Technology of a Conserver Society.
In Karl Henion and Thomas Kinnear, eds., The Conserver Society. American Marketing Association.

Abstract: The world has come within sight of the limits of our planet's capacity to sustain past rates of growth in human demand on finite resources. Environmental regulations have spurred a number of innovations in industrial waste treatment. Opportunities for new types of inventions abound (e.g., producing a cheap photovoltaic cell capable of transforming sunlight into electricity).

0920

Council on Environmental Quality
1980 Public Opinion on Environmental Issues: Results of a National Public Opinion Survey.
Conducted by Resources for the Future.

Objectives: (1) To learn about key public opinion trends over the past decade; and (2) to determine public responses to choices between environmental protection and other values

Method: In the first four months of 1980, 1,576 adults were interviewed nationwide.

Variables: Various energy-related opinions and attitudes

Findings/implications: The public generally does not favour protecting the environment at the expense of an adequate supply of energy. The most-preferred energy sources are solar, coal and water power; the least-preferred source is nuclear. Twenty-eight per cent of homeowners had considered installing solar heating equipment in their homes. Twenty per cent were in favour of shutting down existing nuclear plants, while 47% were against construction of any more plants. Nearly three-quarters of respondents (73%) were "greatly concerned" about possible energy shortages (vs. 57% in 1974). Eighty-one per cent were concerned about inflation, and 39% about cleaning up waterways. Only 63% knew that the United States imported oil to meet domestic needs.

Only those aspects of the survey concerned with energy are reported here.

0925

Craig, C. Samuel
1980 Assessing the Role of Predispositions and Discretion in Determining Energy Consumption.
Working paper, Graduate School of Business Administration, New York University.

Objective: To examine the relationship between predispositions and energy consumption

Method: Respondents (all female) were members of a consumer panel in the New York City area. Questionnaires were sent to 1,000 members; 700 were returned. Since the analysis required individual metering and data on electricity consumption for nine consecutive months, the final analysis was restricted to 286 cases (206 had air conditioners). None used electricity for space heating.

Variables: Dependent: electricity consumption: (a) in winter (December, January, February); (b) in summer (June, July, August); (c) change (March, April, May)

Independent: demographics (income, education, age, dwelling size, family size); attitudes (four factors emerged as significant: correlation ethic, motivation to conserve, proutility and pronuclear); air conditioner vs. no air conditioner

Findings/implications: Winter consumption for households without air conditioners was 99 kW·h greater than their summer consumption. In summer, households with air conditioners consumed more electricity (1,494 kW·h vs. 855 kW·h). There were no differences in attitudes and beliefs between those who owned air conditioners and those who did not. Those in air-conditioned households were younger, better educated and had higher incomes. Income was positively related to the consumption of electricity for households with air conditioning, and education negatively related, but only for the summer. Dwelling size was related to consumption only during winter for air-conditioned households. Air conditioner owners consumed more electricity during the winter (294 kW·h more). Those who are more proutility tend to consume more. Communication programs designed to reduce consumption must reach consumers with discretionary capacity -- those with air conditioners. More research is required to determine what belief structures lie behind energy-wasting behaviour. Before effective conservation programs can be implemented, the relationship between attitudes and consumption must be more clearly understood.

0930

Craig, C. Samuel, and John M. McCann
1980 Consumers Without a Direct Economic Incentive to Conserve Energy.
Journal of Environmental Systems, 10, 2, 157-164.

Objective: To identify differences in behaviour and characteristics between those living in master-metered apartments and those in single-metered apartments

Method: A questionnaire was mailed to 1,000 members of Market Facts consumer panel in the New York City area. Usable returns were provided by 700 (556 single-metered and 124 master-metered). Multiple discriminant analysis was used to determine how the two groups differed.

Variables: Dependent: demographics, dwelling characteristics, attitudes towards certain energy conservation practices, belief about individual's role in conserving electricity, belief about their consumption relative to others

Independent: single- vs. master-metered

Findings/implications: People living in master-metered dwellings were more likely to be nonmarried, but have more children. The also believe they use less electricity than people living in comparable single-metered dwellings. They are less likely to turn the lights off when leaving a room, more likely to leave the television on and more likely to leave the air conditioner on when no one is home. In the absence of a direct economic incentive to conserve electricity, some other means must be devised to effect conservation among these individuals.

0935

Craig, C. Samuel, and John M. McCann
1979 Developing Strategies for Influencing Residential Consumption of Electricity.
Journal of Environmental Systems, 9, 2, 175-187.

Objective: To provide an empirical basis for marketing strategies aimed at modifying the demand for electricity

Method: Questionnaires were sent to 2,000 of Con Edison's "heavy users"; 375 usable returns were obtained.

Variables: Dependent: actual electricity usage

Independent: attitudes, interests and opinions concerning energy and energy-related issues; frequency of use of major appliances; time of use of major appliances; demographics; score on Rotter's Internal-External Scale

Findings/implications: Consumers can deal with time-of-day pricing by demand denial (not using appliances) or by demand deferral (using appliances during off-peak periods). Characteristics of target markets for demarketing (demand denial) efforts include: live in houses, own dwelling, larger homes, higher income, higher electricity bills, more people in household, tend to be externals, older, and talk about energy conservation. Externals view themselves more as hapless pawns of fate than masters of their own destiny. Characteristics of target markets for syncro-marketing (demand deferral) efforts are the following: live in house, own dwelling, larger homes, higher income, higher electricity bills, more education, and managerial.

0940

Craig, Paul P., Joel Darmstadter, and Stephen Rattien
1976 Social and Institutional Factors in Energy Conservation. Annual Review of Energy, 1, 535-551.

Abstract: This paper focuses on the following aspects of energy conservation: factors which have historically discouraged it, recent changes, suggested strategies for conserving, potential limitations and prospects for the future. One controversial aspect of energy conservation is that too often energy and monetary savings are accompanied by undesirable trade-offs and disutilities of lifestyle. Monetary savings should be supplemented with other incentives to achieve a real effect. Mention is made of the term "energy accounting" to analyze why any analysis of conservation programs must take into account both direct uses of energy and indirect energy inputs which maintain the entire system.

Several strategies for conservation, including technical advances, shifts to less energy-intensive products and the role of government, are discussed. The relationship between energy consumption and GNP is also chronicled. Of greater importance is an analysis of the reasons behind today's excessive consumption and the reasons for encouraging conservation. Energy conservation is directly related to fundamental issues such as lifestyle and land-use pattern changes, balance of payments problems, world political stability and national security. Recent policies include minimum performance standards on automobiles, labelling, reduced speed limits and reduced electricity use. But consumer attitudes are not overwhelmingly in favour of stringent conservation programs at the expense of economic and social well-being, and this is seen as a stumbling block. Those conservation practices which are practiced tend to be convenient and involve little cost. Future government actions include providing information, creating awareness, improving electric utility rate structures and introducing various financial incentives. A coordinated government policy and a change in consumer attitudes are the key ingredients for the implementation of a long-run conservation strategy.

0945

Crompton, John L., and Richard J. Gitelson
1981 Consumer Reactions to the Standby Motor Fuel Rationing Plan. Journal of Travel Research, 14, 4, 27-36.

Objective: To investigate the reactions of different types of automobile travellers to future gasoline rationing and increases in gasoline prices

Method: The data collection instrument contained seven gasoline rationing or pricing scenarios. Three trained interviewers at four Texas welcome centres interviewed 1,816 travellers from May through mid-July in 1980. The respondents were predominantly male.

Variables: Dependent: respondent reactions to scenarios

Independent: rationing and pricing scenarios, sociodemographic variables, trip variables, population segment

Findings/implications: The data indicate a substantially greater impact on behaviour from the rationing scenarios than from the price increase scenarios. It would have taken a price increase of $1.25/gal. to achieve a comparable impact to rationing at a level of 50 gals. per vehicle per month. In the business section, even this price increase would not be as effective as rationing. The issue of societal inadequacies from higher prices is addressed. In each population segment studied the major pricing impact comes at 75¢. Even a 25¢ price increase, however, results in a significant impact on travel behaviour. Business travel behaviour, as expected, was found to be relatively price inelastic. A price increase of 75¢/gal. results in much the same behavioural response as does curtailing access to gasoline on weekends. The authors compare their results with those of similar studies. A major implication is that the levying of a substantial tax on gasoline will raise large revenues but will have mainly a short-term effect on travel behaviour.

0950

Crossley, David J.
1981 Separate Realities? Energy and Social Science Research in Australia.
Discussion paper presented to a seminar organized by the Academy of Social Sciences in Australia, April 13-14.

Abstract: This is a personal and critical assessment of the current status of social science research on the topic of energy, and it includes several recommendations about what needs to be done. A fundamental concern is the way in which energy- and society-related issues are conceptualized; only recently have public responses been of a longer-term and wider-ranging character. The author believes the major problem facing social energy research in Australia is the existence of two distinct, as yet irreconcilable outlooks: the first is largely technical and supply-demand oriented, while the second classifies energy problems as outgrowths of a much more serious societal crisis affecting all industrialized nations. Three general objectives for social science research into energy issues are then discussed: (1) monitoring or describing energy use, in which the seeking of detailed, disaggregated data is favoured; (2) modelling energy use, in which doubt is expressed as to the accuracy of the measurement of behavioural influences in econometric models (a series of in-depth micro-level studies of individual energy consumers is recommended); and (3) assessment of energy policy: it is suggested that the effects of policy initiatives on economic, environmental and social factors be studied more closely, and more attention given to estimating the likely consequences of policy proposals in advance. Considerable research should be directed towards theoretical aspects of policy formulation in the form of both explanatory and normative studies. The author concludes by stating that energy-related research should be conducted in as many different types of locations as possible and involve people familiar with policymaking, commerce, industry and the personal aspects of energy issues.

0955

Crossley, David J.
1981 Social and Institutional Barriers to Energy Conservation. Paper presented to the 51st Anzaas Congress, Brisbane, May 11-15.

Objective: To identify and analyze nontechnical constraints on household energy conservation

Method: Structured, in-home interviews were conducted with 47 people representing different socioeconomic classes in the Melbourne metropolitan area. The procedure used to select respondents was not designed to obtain a statistically representative sample of the Melbourne population, but to focus mainly on representatives of cultures who are likely to experience considerable constraints on potential energy-using behaviour.

Variables: Dependent: attitudes towards energy use, conservation; awareness of usage; adoption or nonadoption of conserving practices; appliance usage

Independent: demographic/socioeconomic background; age, income, occupation, stage in family life cycle; dwelling characteristics, location; availability and use of transport

Findings/implications: Physical living restrictions were often mentioned by respondents; they included living in connected housing (i.e., flats), living a long distance from work (preventing the use of public transit) or living where access to transit was limited in the first place. Social constraints included childrens' energy-wasting behaviour and the fact that housing was rented. A common barrier was perceived costs of conservation practices, as were time penalties (using the bus and driving slower) and the inconvenience aspect. While regulatory/legal constraints exist, they were not mentioned in the survey; neither were barriers associated with suppliers. Several respondents claimed that a lack of information, in the form of either a complete lack of awareness or insufficient knowledge, hindered their conservation behaviour. Many were also not motivated to seek out information. While this paper is successful in classifying constraints in general terms, it is extremely difficult to identify the causes of these constraints due to the uniqueness of each situation from which the barrier is created. Understanding the circumstances surrounding each constraint is where future research should be directed.

0960

Crossley, David J.

1980 Energy Saving Without Tears Depends on Changing Habits.
Royal Australian Planning Institute Journal, 18, 4, 130-133.

Abstract: The image of energy conservation has historically been largely misguided and negative. While recent behaviour has indicated some support for the concept, the changes have been minimal. Part of the problem is terminology: "energy conservation" has become a confused, imprecise phrase defining a similarly misunderstood process. The fact that it is a process is often missed as well, but it must be regarded as such if conservation programs are to be successfully implemented. Of greater importance is the recognition that energy saving is a behavioural issue of great magnitude, and that positive results will almost certainly follow from some lifestyle changes along the way. Four basic methods of reducing energy are discussed: "reducing waste, increasing efficiency of use, changing the environment and changing usage behaviour. Three effects of these actions are: (1) a reduction in energy intensity, (2) a lowering of the level of related activity, and (3) both. Each of these methods can be combined with each effect to produce a total of 12 different groups of energy-saving practices. Further improvements can also be made in the cities in terms of building structures, land-use patterns, public transit and population densities. The changes in cities resulting from conservation policies are discussed in some detail, including an example from the city of Melbourne. The central point is that urban reorganization in the face of energy shortages can strengthen interpersonal relationships and thereby enhance human well-being.

0965

Crossley, David J.
1980 Social Factors Affecting Energy Use and Conservation in the Home.
Working paper, School of Australian Environmental Studies, Griffith University, Brisbane.

Objectives: (1) To investigate intentions, beliefs and attitudes in relation to energy use and conservation; and (2) to determine whether it is possible to predict energy-using behaviour from beliefs and attitudes

Method: In 1977, 1,001 persons were surveyed in Brisbane, Australia; 512 questionnaires were returned in usable form.

Variables: Dependent: energy beliefs and attitudes, intentions of conserving, energy-using behaviour

Independent: demographics

A number of indices were calculated: respondent belief about energy-conserving practices, respondent belief about past energy prices, respondent belief about future energy prices, respondent attitude towards energy issues.

Findings/implications: Overall, there was a strong intention to adopt energy-conserving practices. The majority believed that Australians use too much energy and that conservation is needed in the home. Those reporting conserving behaviour or intentions to do so were more likely to be women, have lower-status occupations and lower incomes. Another important social factor was number of persons in household. Few statistically significant correlations were found between indices of household energy-using behaviour and the social factors of respondents' beliefs and attitudes. Public policy should use persuasive messages to emphasize the reality of energy shortages and to inform households on how they might save energy.

0970

Crossley, David J.
1978 Householders' Attitudes, Knowledge and Behavior Regarding Energy Conservation.
Proceedings of Conference on Energy Conservation in the Built Environment, Department of Environment, Housing and Community Development, Canberra, Australia, pp. 239-260.

Abstract: This paper summarizes several recent studies on residential energy use and conservation, including one done by the author himself. He is convinced that attitudes and behaviour regarding energy use in the home are important determinants of energy consumption in society as a whole. A number of common themes emerge from these studies, which were conducted in the United States, the United Kingdom, New Zealand and Australia. The most significant demographic variable is income: greater energy use is associated with higher income levels. But several other constraints restrict the ability to choose among energy-use options: lack of services, structural features of the dwelling, method of ownership and, especially, a lack of knowledge about available alternative practices. While attitudes towards energy conservation vary, there is considerable doubt that individual actions will contribute significantly to energy savings. Moreover, there is a distinct attitude-behaviour controversy in that those who verbally support the idea of conservation in the home do not use energy any differently from those who do not share this opinion. As opposed to price increases, a more equitable way to encourage energy conservation would be to strengthen attitudes in favour of conservation and to remove the legal, social and economic constraints that discourage conservation practices. An information and education campaign is recommended to inform the public, while various financial incentives and some mandatory requirements are supported to promote behavioural change. These policies can do much to reduce the high levels of home energy use commonly found in Western affluent societies.

1205

D'Amore, Louis J.
1980 Energy Conservation: A Total Community Approach Through Public Participation.
Urban Forum, 4, 6, 12-20.

Abstract: This article describes an energy conservation demonstration project conducted in three Canadian centres: Fredericton, New Brunswick, Richmond Hill, Ontario, and Vernon, British Columbia. The aim of the project was to generate a high level of awareness and knowledge of the energy situation and of the importance of energy conservation. It was hoped that this awareness would evolve into attitudes and eventually into conservation behaviour. The basic premise is that the people, groups and business in a community will be more apt to adopt energy-conserving behaviour when the total community is involved in sharing that effort and when the goals and program are established and supported by all segments of the community. The project consisted of five stages over ten months, beginning in September 1979: (1) animation: discussions were conducted with key community organizations to specifically tailor the project design; (2) awareness: the project was publicized; (3) collaboration: citizens formed task groups for a number of self-determined "Key Interest Areas" (KIAs); (4) integration: citizens from different KIAs worked together to draw up an integrated strategy and action plan; (5) consensus: support was sought from all community segments for the goals and action plan. Evaluation was achieved by (1) telephone surveys (before and after), (2) monitoring actual energy usage, and (3) in-depth case studies. Some of the actions taken by each of the communities at the time of writing are detailed.

1210

Darmstadter, Joel, Joy Dunkerley, and Jack Alterman
1979 International Variations in Energy Use: Findings from a Comparative Study.
Economic Impact, no. 27, 44-51.

Objective: To identify and sort out some of the principal factors that account for differential energy-use patterns

Method: Patterns of energy consumption for nine countries (the United States, Canada, France, West Germany, Italy, the Netherlands, the United Kingdom, Sweden and Japan) are studied using 1972 data.

Variables: Dependent: energy consumption/gross domestic product (GDP)

Independent: economic structure, characteristics of energy utilization

Findings/implications: Canada and the United States consume on average about 50% more energy relative to GDP than Japan and the countries of Western Europe. Transport alone accounts for between 30% and 50% of the difference. U.S. energy consumption in the household sector is considerably higher because of the prevalence of single-family homes, different heating habits and lower energy prices. All in all, a number of factors are important: (1) economic: energy prices are generally lower in the United States, and though it is difficult to isolate their effects, they undoubtedly help increase consumption; (2) geographic: both the climate and size of a country affect consumption (Canada is affected greatly by both variables); (3) energy resource endowment: energy-extractive industries require large inputs of energy, and the availability of energy may encourage fewer energy-conservation practices; (4) import dependence: there is a high association between import (energy) dependence and energy consumption relative to GDP. The assumed presence of an energy conservation ethic in countries other than the United States is a very simplistic view.

1215

De Boer, Connie
1977 The Polls: Nuclear Energy.
Public Opinion Quarterly, 41, 402-411.

Objective: To investigate the public's attitude towards the prospect of nuclear energy meeting the energy demands of several countries in the future

Method: The results of polls taken by various organizations in the United States, West Germany, Denmark, the Netherlands and Great Britain are reviewed.

Variables: Attitudes and opinions regarding: the importance of building nuclear plants, the supplying of nuclear power (plants) to other countries; the safety of nuclear plants; the construction of a plant near one's home

Findings/implications: In July 1976, 71% of Americans felt it was somewhat or extremely important to build nuclear plants to meet future power needs. Over 50% felt technology was more likely than a conservation program to improve the energy situation. In March 1977, 65% of Americans disapproved of building nuclear plants in countries that currently did not have them. In February 1956, 20% said they would be afraid to have an atomic energy-run plant in their community. Twenty years later, 45% said they would be against the construction of a nuclear power plant in their area. In 1975, 23% of Danes were against building nuclear plants under any circumstances. In 1977 only 27% of the Dutch were for the large-scale use of nuclear energy for generating electric power. In 1976, 44% felt nuclear plants would be indispensable for meeting long-run electricity demands (as opposed to 56% three years earlier). In 1977, 47% of West Germans were against the construction of a nuclear plant in their area (35% were for). In 1976 in Great Britain 34% said they would oppose the construction of a nuclear power plant in their area.

1220

Decima Research

1980 A Nationwide Study of Energy Conservation Behavior and Attitudes.
Prepared for Energy, Mines and Resources Canada.

Objective: To provide a detailed examination of Canadians' energy-related attitudes, opinions and behaviour

Method: In-home interviews were conducted with 1,505 Canadians, nationwide, in September 1979.

Variables: Dependent: attitudes, opinions and behaviour regarding energy conservation, the energy crisis, government's role in the energy crisis, etc.

Independent: demographics, values

Findings/implications: Individuals who are conserving the most at present claim they can cut back more so than do others. Those sensitive to the conservation of energy are not necessarily the same people who exhibit energy-conserving behaviour. The automobile and automobile-related activity have not become part of the general consciousness associated with conservation behaviour. In terms of values, three dimensions have a bearing on the amount of conservation behaviour demonstrated: (1) the moral commitment to "doing good," (2) the level of personal involvement, and (3) economic constraints and opportunities. Values most strongly related to the absence of conservation behaviour are a desire to be somewhat self-indulgent, and a commitment to the automobile. Major barriers to accepting the importance of conserving energy are a refusal to admit Canada is facing an energy crisis and a refusal to change lifestyles or lower expectations. Energy as a concern was ranked third most often after inflation and unemployment. The following factors come together in different ways to produce different degrees of conservation sensitivity and behaviour: (1) viewing conservation as a moral duty, (2) proactive vs. passive response to problems and involvement, (3) perception of a growing problem, (4) economic viability of conserving behaviour given the socioeconomic status of the respondent. Information sources deemed most believable were experts, religious leaders and community activists. Least believable were industry advertisements, businessmen and celebrities. Nearly one-third (32%) felt Canada was facing an energy shortage at present, while 27% felt such a shortage was unlikely to occur in the 1980s. Over 60% were opposed to further construction of nuclear power plants. Support increased with occupation, income and socioeconomic status. The most acceptable policy options

Decima Research (cont.)

were those least affecting the actual day-to-day life of the respondent (as opposed to fuel taxes, rationing or regulating fill-up days). Using less energy is more frequently perceived to have negative rather than positive consequences. The less prone one is to conserve energy, the more prone one is to believe that using less energy will decrease the quality of life. People believe that "others" can cut back more on energy consumption than they can. They do admit, however, that they could cut back, and that if they and others did it would have significant effects.

1225

Deslauriers, Brian C., and Peter B. Everett
1977 Effects of Intermittent and Continuous Token Reinforcement on Bus Ridership.
Journal of Applied Psychology, 62, 4, 369-375.

Objective: To evaluate the relative effectiveness of continuous and intermittent reinforcement on bus ridership

Method: The setting was a 4 km university bus route, on which two buses ran from 8:00 a.m. until 5:00 p.m. The 11:00-2:00 bus was designated as the experimental bus. Baseline was monitored for six weeks. Tokens redeemable for merchandise were variably distributed (to every third passenger) on the experimental bus for 15 days, then continually (to each passenger) for 10 days. The variable distribution was reinstituted for 8 days, followed by a further baseline of 10 days. Red stars were mounted on the experimental bus during treatment periods. The token program was advertised in the campus newspaper. On the final day of Baseline I and continuous reinforcement, questionnaires were distributed to all passengers on the experimental bus; 211 were returned.

Variables: Dependent: bus ridership

Independent: treatment

Findings/implications: Experimental bus ridership as a percentage of mean ridership for controls A and B was the following: Baseline I, 97%; Variable Ratio 3 (I), 127%; Continuous Reinforcement, 130%; Variable Ratio 3 (II), 137%; Baseline II, 117%. During baselines there was no statistically significant difference between the experimental bus and controls, but during treatment, ridership increased significantly on the experimental bus. During continuous reinforcement 70% of riders said they would have ridden the bus without tokens. Most (73%) reported they would have walked if they had not taken the bus. Intermittent reinforcement may be as effective as continuous reinforcement. Other intermittent reinforcement schedules may be worthwhile investigating in urban settings. The campus setting is inadequate for evaluating the impact of token reinforcement on car drivers because of university restrictions on vehicular traffic.

1230

Dillman, Joyce J., Kenneth Tremblay, and Don Dillman
1977 Energy Policies Directed at the Home: Which Ones Will People Accept?
Housing Educators Journal, 4, 2, 2-13.

Objective: To determine the level of public acceptance of several meaningful policy choices

Method: Questionnaires were mailed to 4,500 households in Washington State. Usable returns were received from 2,750.

Variables: Dependent: related difficulty of accepting nine proposed policies (on a five-point scale from very hard to very easy), choice between temperature limitation and space reduction policies

Independent: demographics, housing characteristics

Findings/implications: By policy, the following percentages represent the respondents who rated acceptance as somewhat or very easy: mandatory heavy insulation, 75.7%; air conditioner no lower than 85°F, 63.8%; close off two to three rooms in winter, 59.1%; heat no higher than 65°F in winter, 47.6%; homes built underground, 30.6%; reduce size and number of windows, 26.2%; build smaller homes, 34.2%; build homes only in cities, 12.4%; build homes so walls are shared with adjoining homes, 5.3%. Persons under age 46 preferred temperature limitation policies, while those over age 46 preferred the space reduction policies. A substantial revision of the American home (e.g., not allowing homes to be built in the country, not allowing single-detached homes) would not be willingly accepted by the American public at this time and might be actively resisted. All households should not be treated the same. A continuous monitoring of people's willingness to accept particular energy policies directed at the home is needed.

1235

Dumas, Joseph S., and Ricardo Dobson
1979 Linking Consumer Attitudes to Bus and Carpool Usage. Transportation Research, 13A, 417-423.

Objective: To study the relationship among beliefs, feelings (modal affect) and behaviour as they relate to buses and carpools, with two different data sets

Method: Attitudinal data were collected by the Federal Highway Administration (FHWA) and the General Motors Research Laboratories (GM). The FHWA data originate from a survey of 800 downtown-area workers of Los Angeles who live within two miles of a freeway. The GM survey consisted of 1,010 respondents from Chicago-area firms which employ at least 100 people. The final sample, from which results were reported, was 400 people, and structural equations estimated by two-stage least squares were derived.

Variables: Dependent: attitudes towards buses, carpools (on the basis of comfort, convenience and time savings); overall satisfaction or liking for buses, carpools in general

Independent: demographics, income, marital status, distance from work, type of residence

Findings/implications: The more people there are in a household, the more comfortable are buses perceived. But the more licensed drivers there are in a household, the less comfortable are buses perceived. The more convenient buses are rated, the stronger is the overall evaluation of them. The aspect of comfort is not as significant. Not only does behaviour influence the rating of system attributes, but there is a strong relationship between feelings (modal affect) and behaviour: the more favourable the overall evaluation of the bus, the greater the frequency of usage. Frequency of usage can best be predicted from feelings rather than from beliefs. Relative to convenience, rated comfort is a more decisive factor for carpools than it is for buses. But, in general, ratings of individual system attributes do not predict frequency of use (behaviour) as accurately as does modal affect, or feelings about the mode as a whole.

The implications of these findings is that asking people to indicate their overall liking of a system will usually result in stronger predictions of behaviour than will asking about perceptions of individual features. Conversely, making changes in the features of bus and carpool systems based on respondent ratings may not lead to increased ridership. Greater frequency of use will

Dumas, Joseph S., and Ricardo Dobson (cont.)

result when the overall evaluation of the system is also improved. It may be necessary to change a potential user's general image of a mode before improving certain features. Further research should be directed at a better understanding of modal affect and market segmentation influence, especially in important user groups.

1240

Dunkerley, Joy
1980 Energy Use Trends in Industrial Countries: Implications for Conservation.
Energy Policy, 8, 2, 105-115.

Abstract: The amount of energy consumed relative to a given level of output (energy/GDP ratio) varies substantially among countries and over time within the same country. In this discussion, the United States is compared to the United Kingdom, West Germany, Sweden, the Netherlands, France and Italy. Variations in the energy/GDP ratio can occur for a number of reasons, including: (1) differences in the structure of energy supply; (2) changes in sectoral energy consumption; (3) composition of economic output; (4) differences in energy prices; (5) government policy; (6) other factors, such as climate, geography or taste (heating comfort). Energy/GDP ratios are only a partial indicator of energy-conservation potential among countries or over time. Changes in prices alone will probably not effect required changes in consumption. It may be necessary not only to supplement price incentives by other conservation mechanisms but also to take a wider sectoral view of energy management.

1245

Dyer, Robert F.
1981 Direct Control of Household Electricity.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 231-241.

Objectives: (1) To review existing literature on direct, peak-load control experiments; and (2) to present the results of a 1979 experimental study of residential direct load control conducted by a large metropolitan electric utility

Method: This Dayton, Ohio, experiment utilized 147 homeowners and three treatment groups: (1) radio-control air conditioning and water heating; (2) radio-control air conditioning; and (3) priority relay -- water heating controlled when air conditioner was in operation. Interviews included two personal at-home (before and after) as well as three telephone.

Variables: Dependent: kilowatt energy consumption (for households and specific appliances within household); customer acceptance (shortages, discomfort, inconvenience, attitude towards utility); awareness of controls; intentions to participate in permanent load control program

Independent: treatment

Findings/implications: Minimal levels of intrusiveness were experienced, and attitudes towards the utility were largely positive. Intentions to participate in future load control programs were high (90%). A review of findings from similar studies in Arkansas, Georgia and Michigan reveals low levels of inconvenience, discomfort, and hot water shortages. However, the studies share the following common weaknesses: (1) in all cases, subjects volunteered for the programs; (2) the treatments utilized are confounded by several factors; (3) a variety of operational definitions of customer acceptance have been employed.

1605

Ebberler, Donald

1980 An Econometric End-Use Analysis of Residential Sector Demand for Electricity in the Southern California Edison Service Area.
Southern California Edison Company, Rosemead, Calif.

Objective: To develop an econometric framework for assessing the potential energy-saving effects of residential sector conservation programs

Method: Data collected in a 1978 Saturation Survey were utilized in the analysis (N = 1,117), as were Southern California Edison utility bills (May 1977 to July 1978) and weather information from government weather stations.

Variables: Dependent: household demand for electricity

Independent: dwelling characterics; number of household occupants; household income; marginal price of electricity for last block consumed; heating/cooling degree days; appliance end-use (17 in all)

Findings/implications: Estimates for all parameters are calculated. Extensions and improvements to the model are noted.

1610

Edelstein, Michael R.
1980 Changing Energy-Related Values: A Suggested Process. Paper presented at the Eleventh Environmental Design Research Association Conference, March 3, Charleston, S.C.

Abstract: The author focuses on changing energy-related values as opposed to the other possible stages, namely, behaviour, beliefs or attitudes. The largest immediate energy-savings payoff would appear to arise from addressing change in energy-consumption behaviour. However, the author contends that the curtailment of energy consumption may not necessarily be for the common good and, further, that any changes in energy-consuming behaviour may be token and temporary. In a similar vein, the author states that beliefs are an inappropriate target for change, in that beliefs derived from authorities are subject to manipulation and may be contradicted by direct experience and social context. Finally he notes that changed attitudes may not necessarily result in changed actions. It is asserted that values underlie attitudes and beliefs and, thus, behaviour; further, that changing values can shift entire networks of attitudes, beliefs and actions. The author concludes by describing an evolving conception which links conservation with a self-analytical learning process.

1615

Eden, Michael, and Margareta Persson

1979 Energy Conservation in a Housing Cluster (ett kvarter sparar energi).
Research program for energy conservation in resident homes. School of Architecture, Chalmers University of Technology, Goteborg, Sweden.

Abstract: The objective of this study was to formulate a basis for investigating energy conservation in resident buildings and to indicate proper methods. Findings are divided into three parts. Part one, "Social Aspects of Six Energy Scenarios," is an examination of different official and nonofficial investigations of energy policy. It is shown that little is known about the social consequences. Important social aspects are, among others, safety for the future, distribution of resources among different consuming sectors, and the possibibilities of comprehending and administering different energy systems. It is also shown that an urgent research field in Sweden is to determine the energy needs that are relevant to building conversion. The aim should be to develop methods for assessing existing conditions and to develop energy-use policies for specific situations. This proposition is bound upon the finding that single policies cannot be generalized across all contexts. In parts two and three, the working methods used by ethnologists and architects are discussed to illustrate their relevance to solutions to the problems pointed out in part one. Part three also presents a summary of earlier studies on energy behaviour, and examples of changes that could be carried through and evaluated.

1620

Eden, Michael, and Margareta Persson
1978 The Energy Utilization Habits of Consumers.
Swedish Council for Building Research, Report R38, Stockholm.

Abstract: This report presents the initial phase of the project entitled "The Utilization of Energy in Multi-family Dwellings." The aim of this study is to determine the knowledge and attitudes of consumers in relation to home energy use, as well as to investigate the functioning of the energy transfer equipment in the home and what opportunities this equipment provides for saving energy. The report presents interviews that were held with the residents and personnel involved in the management and running of a number of multifamily dwellings. Even though the basic material is too limited to enable any general conclusions to be drawn, the opinion is that a number of assumptions have been confirmed by the study; for example, that permanent energy savings can only be achieved on the basis of knowledge about the situation of individual consumers coupled with the cooperation of users, and that the trimming of technical installations equipment, modernization and efforts aimed at saving energy must be followed up in order to achieve the intended results. The study has also resulted in the working out of routines for carrying out surveys in this field.

1625

Elder, Jacqueline
1980 State-of-the-Art Summary of Incentives for Residential Water Conservation.
Prepared for Office of Policy Development and Research, Department of Housing and Urban Development (U.S.).

Abstract: This report addresses some programs and techniques that have been developed to encourage residential water conservation. Other energy conservation techniques that appear to be directly related to water conservation include feedback, incentives in mass-metered residences and various pricing or metering systems (peak-load pricing, increasing block tariffs, etc.).

1630

Electric Power Research Institute
1979 Patterns of Energy Use by Electrical Appliances.
Prepared by Midwest Research Institute.

Objectives: (1) To compile a data base on residential electrical energy-use; (2) to analyze factors influencing energy use and ownership; and (3) to determine national/regional appliance energy-use patterns

Method: Interviews were conducted in 16 American cities in 1976 (N = 1,985). Electricity bills were collected from utility records for all households from April 1976 to July 1977. Gas bills for 702 homes were also collected. Appliance electricity use for 150 homes was monitored by devices fitted to the appliances (over the same time period). A follow-up survey in March 1977 reached 1,467 of the households.

Variables; Dependent: energy usage

Independent: home-heating characteristics, demographics

Findings/implications: Appliance ownership was generally higher in suburban (vs. urban) areas, and for people with higher incomes. Examples of saturation levels were freezers, 37%; dishwasher, 40%; clothes washers, 87%; dryers, 43%; and room air conditioners, 42%. Annual kW·h consumption (on the average) for refrigerators was 1,665 kW·h, freezers, 1,342 kW·h; and electric clothes dryers, 1,032 kW·h. Average daily electricity consumption in the 16 cities varied from 42.5 kW·h in Miami to 14.2 kW·h in San Diego. Consumption was related to the number of residents in the household and to gross family income.

1635

Ellis, Peter, and George Gaskell
1978 A Review of Social Research on the Individual Energy Consumer.
Working paper, Department of Social Psychology, London School of Economics and Political Science, England.

Abstract: The paper reviews and evaluates published research and current work relating to human factors in the use of environmental energy. It focuses on the motivation, cognitions and behaviour of the individual energy user in relation to buildings and transport. Interrelations between buildings and users are complex and interactive. Antecedents of conservation are more education, high socioeconomic status and a less elderly age. There is a weak relationship between energy conservation and attitudes, knowledge and opinions, though experience (e.g., a shortage) may increase behaviour. Social compassion and conformity make the social setting an important reference for modifying norms and attitudes. Pricing strategy as a means of regulating energy consumption suffers somewhat: it can be socially inequitable; little is known about the magnitude of price changes required to effect conservation; and price changes do not tell consumers how to use energy more efficiently. In terms of cognitive strategies, or providing information to consumers, information on the consequences of excessive long-term consumption may change awareness and thereby increase receptivity to policies, but in itself probably will not change consumption patterns. Specific information related to the effects of a consumer's specific acts should be communicated directly through social reference groups, and not through the mass media. Conservation should be related to an individual's own short-term interests. Feedback on consumption has been the subject of various experiments, and important factors involved are immediacy, specificity, duration and form of presentation. Feedback may not provide strong enough motivation to effect major changes in lifestyle. Factors inhibiting conservation are: (1) the lack of a clear picture with regard to the long-term energy situation; (2) a lack of clear government energy conservation policy; (3) perceptions that others are not conserving; (4) a lack of knowledge (specific to energy usage); (5) poorly designed energy system controls; and (6) a lack of clear and appropriate feedback information. Research priorities include: (1) developing and testing models of energy systems which take into account the effect of the user on total energy consumption; (2) investigating people's responses to economic influences related to energy consumption; (3) analyzing the structure of individual beliefs related to energy consumption; (4) investigating the effectiveness of various channels in communicating information; and (5) evaluating the concept of feedback to the energy user.

1640

Environmental Research Centre

1977 Northwest Energy Policy Project: Energy Conservation Policy Evaluation.
Submitted to the Northwest Energy Policy Project by the Environmental Research Center, Washington State University, Pullman, Wash.

Objectives: (1) To find out how much energy could be saved by various measures; (2) to identify policies that might bring about the adoption of the measures; and (3) to estimate the impact of various conservation policies

Method: Conservation measures were identified and a technical/engineering evaluation was conducted to determine their applicability to the Pacific Northwest. Further analysis calculated potential energy savings for each measure.

Variables: Dependent: potential reduction in energy consumption in the Pacific Northwest

Independent: various conservation measures in the residential, commercial, industrial and transportation sectors

Findings/implications: If all conservation measures were implemented, the total potential conservation by all energy forms is 35% (by 2000). Potentials are 40% for electricity, 36% for coal, 64% for gas and 27% for gasoline. Attitudes in support of the goals of conservation are important determinants of the prospects for adoption of conservation measures. Adoption is largely dependent upon evidence of economic savings to be realized. Calculation of costs and benefits shows that unconventional heating systems generally do not meet the criteria for evaluating measures. Some profitable measures involve undesirable quality-of-life effects that deter adoption (e.g., lowering thermostats affects comfort). Measures in the transportation sector depend more on the user's willingness to accept a lower "quality" service (e.g., taking the bus, smaller cars, shipping freight by rail). Policy options can involve changing prices (including granting subsidies), changing demand (by supplying information) and regulating consumers. The scope of the policies implemented is limited by the states' limited jurisdictions and their financial resources. Strong policies are required to realize the full potential for conservation.

1645

Erickson, Edward W., Robert M. Spann, and Robert Ciliano
1973 Substitution and Usage in Energy Demand: An Econometric Estimation of Long-run and Short-run Effects. In Energy Modeling: Art, Science, Practice (working papers for a seminar on energy modeling, Jan. 25-26, Washington, D.C.).

Objective: To formulate a model which forecasts future fuel demands, where the effects of each specific fuel are measured for each sector (since BTUs derived from alternative fuels are not perfect substitutes). This will allow policy-makers to forecast future energy needs under a wide variety of conditions

Method: Four sectors are included: residential and commercial, industrial, transportation and electrical generation. The demand for energy within each sector-fuel combination is broken down into short- and long-run elements, and both individual and aggregate projections can be made. A rationale is presented for using a related model in the home-heating market to determine which factors are most important in influencing the choice of heating mode. Finally, an application of the model is made to measure average usage rates of electricity for space heating in the residential sector.

Variables: Dependent: energy consumption, appliance stock, usage, intersubstitutability of heating sources

Independent: degree of urbanization, climate, population, fuel prices, income, location, availability of fuel, incidence of air conditioning

Findings/implications: The major determinants of home-heating mode choice are the relative prices of oil and natural gas, since the consumer perceives oil and gas as being very close substitutes. The decision to heat electrically seems to be based more on nonprice factors. The incidence of air conditioning is positively related to the size of electricity's market share, and a similar relationship exists with the proportion of natural gas heating and the degree of urbanization. While higher-income consumers are more likely to use electrical heat, there is no evidence of greater gas usage in areas of expected greater gas availability. A significant influence on oil-heating decisions is temperature: oil heating is more likely to be chosen in colder climates.

The results for the model application (average usage rates of electricity) show that price and income are important determinants of usage. The effects of urbanization and winter temperatures were inconclusive.

Erickson, Edward W., Robert M. Spann, and Robert Ciliano (cont.)

This model has definite relevance for national energy policy even though the results are only preliminary. The price sensitivity of home-heating decisions is directly applicable to natural gas shortages. (One suggestion is to let natural gas prices rise to equilibrium levels and hold fuel oil prices constant to facilitate substitution.) In addition, the price sensitivity of electricity usage suggests that the price mechanism is perhaps one method by which scarce generating capacity can be rationed.

1650

Everett, Peter B.
1980 Reinforcement Theory Strategies for Modifying Transit Ridership.
In Altman, Wohlwill, and Everett, eds., Human Behavior and the Environment: Transportation. New York: Plenum Publishing Company.

Abstract: This paper presents a reinforcement theory model of transit ridership, discusses applications of reinforcement theory to changing transit ridership, and looks at the future of reinforcement theory applications to urban transportation problems. There are reinforcing and punishing consequences for behaviour. In the case of driving a car, reinforcers include flexibility, prestige and privacy, while punishers include gasoline costs, congestion and parking. For transit use, one reinforcer is freedom from car responsibilities, and punishers include fares, waiting time, crowds, noise, etc. To increase transit ridership vis-à-vis car use, reinforcers and punishers for either or both could be manipulated. Various transit systems have tried to increase ridership by handing out coupons redeemable for merchandise. Very little data has been collected on such attempts. In an experiment which tested this procedure, ridership was increased 30%, using both continuous and variable reinforcement schedules. Other manipulations have removed punishers by reducing fares, either in off-peak periods or entirely. An experiment involving free use of transit increased ridership nearly 60% above baseline (control ridership increased 16% at the same time). Another experiment testing contingent free transit showed even greater effects on ridership. Two large-scale demonstration projects are currently underway. In Spokane, Washington, a systemwide token reinforcement procedure will be tested for 2 1/2 years. In Minneapolis-St.Paul, Minnesota, a program testing various aspects of free rides will be implemented. There are other aspects which should be studied as well: service-related reinforcers (ride quality, service frequency, etc.), more effective communication of route/schedule information, waiting behaviour and driver behaviour.

1655

Everett, Peter B., Scott C. Hayward, and Andrew W. Meyers
1974 The Effects of a Token Reinforcement Procedure on Bus Ridership.
Journal of Applied Behavior Analysis, 7, 1-9.

Objective: To demonstrate the applicability of operant techniques to urban transportation problems

Method: The experiment was conducted during the winter term of a large state university in a college town of approximately 40,000 people, including students. The bus route used in the study spanned 2.5 miles of the university campus. Tokens, exchangeable for a variety of backup reinforcers such as ice cream, beer, pizza, movies, etc., were delivered for several days to all persons boarding a clearly marked campus bus. Every passenger was required to pay the usual ten-cent fare.

Variables: Dependent: daily ridership counts

Independent: riding the bus with the tokens or one without

Findings/implications: Daily ridership increased during the eight days of the experiment. It appeared that the tokens attracted new transit passengers as opposed to simply effecting a shift in bus patronage by riders. The authors argue that, with the cooperation of transit authorities and local merchants, token reinforcement procedures can increase bus ridership. The authors add that other areas of operant research such as schedules of reinforcement deserve future study.

2005

Federal Energy Administration
1976 Carpool Incentives: Analysis of Transportation and Energy Impacts.
Office of Energy Conservation and Environment, Washington, D.C.

Objectives: (1) To collect information on carpooling behaviour and analyze existing experience with strategies that may encourage ride-sharing; and (2) to recommend strategies for increasing carpooling and reducing fuel consumption that will be both feasible and effective

Method: The impact of carpooling on travel behaviour and energy consumption is quantitatively analyzed. Part of the analysis was conducted in a case study framework using data from Washington, D.C., and Birmingham, Alabama.

Variables: Dependent: household automobile ownership, work-trip mode choice, nonwork travel, energy consumption

Independent: carpool strategies, carpool matching, vanpools, carpool cost subsidies, mandatory carpool programs, preferential traffic control, gasoline rationing, trip tolls, gasoline price increases, vehicle ownership taxes

Findings/implications: The fuel conservation potential of individual carpooling strategies is in the range of 0.5%-2.0% areawide. The coordination of several strategies might increase it to 5% areawide. Disincentives to the use of private autos are more effective than pure carpool incentives. Sensitivity to carpool incentives will depend on: (1) the viability of transit as a modal alternative, (2) the availability and cost of parking, (3) the distribution of employer size and the geographic location of work places, and (4) residential density. Carpool strategies should be designed to affect more than work trips alone. Any strategy directed at central-city work trips is reaching only 6.16% of total areawide travel. Total fuel savings for nonwork travel are approximately seven times as large as the work-trip reductions in fuel consumption. Fuel savings accomplished with reduced work vehicle miles may be offset by increased nonwork mileage (because of increased auto availability at home). Areawide carpool programs will attract transit riders as well as drive-alone commuters. Carpooling strategies may affect long-term second order changes (reduced auto ownership or shifting to more fuel-efficient vehicles). Five strategies are recommended for immediate use as carpool incentives: vanpools and buspools; employer-based carpool matching and promotion, preferential traffic

Federal Energy Administration (cont.)

control, preferential carpool parking, and carpool parking subsidies. Major changes in urban travel patterns will not occur in the immediate future. Comprehensive energy-sensitive transportation plans should be developed in each of the nation's major urban areas.

2010

Fisher, Frank

1980 Household Energy Use — And Its Relationship to Socio-economic Variables.
In Petroleum, Policies and People. Australian Institute of Energy, Melbourne.

Objective: To examine energy use in relation to some crude socio-economic variables

Method: Four hundred households in Williamstown, Australia, were interviewed in 1977.

Variables: Dependent: energy consumption (gas, wood, electricity, oil)

Independent: socioeconomic characteristics (family size, age, national origin, occupation, education, income), capital improved value (CIV) of home

Findings/implications: The most popular energy sources were gas (48%) and electricity (37%). Education and income were correlated with total energy used, electricity use, and incidence of gas, oil, briquette, wood and kerosene use. Total energy use was strongly correlated with education and income except for single-person households, where the correlation was weak but definitely negative. The correlation between CIV and energy use was high but not as strong as that with income.

2015

Foster, Harold D., and W.R. Derrick Sewell
1980 Perceptions, Attitudes and the Potential for Solar Space Heating in Canada.
In E. Jackson and L. Foster, eds., Energy Attitudes and Policies. Cornett Papers, University of Victoria.

Objectives: (1) To identify barriers to the process of diffusion of solar heating; and (2) to identify policies that may help remove the barriers

Method: Questionnaires (2,452) were distributed in Canada to members of 14 different groups (including consumers, scientists, government officials, solar energy society members, the media, etc.). Usable returns were received from 687. As well, a number of in-depth interviews were conducted with federal government officials.

Variables: Dependent: anticipated adoption rates of solar in Canada, perceived barriers to adoption, perceived effectiveness of incentives

Independent: group membership

Findings/implications: Most optimistic about the anticipated use of solar energy, for at least partial home heating, were manufacturers. Least optimistic were provincial government officials. Scientists, solar energy society members and architects were less optimistic than the general public, other politicians and the media. The most important barriers were the cost of purchase and installation, the public's willingness to pay, compatability with older structures, a lack of federal government support, and the public's environmental apathy. Incentives perceived as being most effective included lower mortgage rates, tax deductions, mass production, government support for basic research, government subsidies for housing projects and information diffusion. Policy recommendations are made based on these perceptions.

2020

Foxx, Richard M., and Monica H. Schaeffer
1981 A Company-Based Lottery to Reduce the Personal Driving of Employees.
Journal of Applied Behavior Analysis, 14, 3, 273-285.

Objective: To attempt to develop a cost-effective and realistic driving reduction program for a business setting

Method: Subjects were selected from the employees of a Washington, D.C., firm after a 28-day baseline monitoring period. Criteria for selection included driving only one car, less than 5% of the mileage for that car accumulated by other drivers, driving more than 40 miles/day, and 40% or more "nonessential" mileage. Fourteen subjects were ultimately selected (eight treatment, six control). Stringent procedures were carried out to prevent rule violations. Treatment subjects received a guide to fuel conservation and were eligible for (four) weekly lotteries if they achieved 10% reductions in mileage driven. To be eligible for the grand month-end lottery, a 10% reduction had to be achieved each week. The dollar value of the lotteries was determined by the reductions achieved. Weekly feedback provided information on dollar savings achieved. Results were publicly posted. Performance was monitored for 28 days post-treatment, and subjects completed a short questionnaire.

Variables: Dependent: miles driven per week, nonessential miles driven per week

Independent: treatment

Findings/implications: During treatment, experimental subjects reduced their mileage on average by 11.6%. At the same time, control subjects increased theirs by 21.2%. During final baseline, experimental subjects exceeded central baseline mileage by 8.8%, while control exceeded baseline by 6.4%. During treatment, five of eight experimental subjects reduced mileage driven (by 42%, 27%, .2%, 17% and 43%). Essential driving, as a percentage of total driving, increased from 39.9% driving baseline to 46.9% during treatment. Total value of prizes ($79) exceeded total gasoline savings ($75) slightly.

Recommendations for further studies and programs are made.

2025

Frisbie, Gil A., Jr.
1980 Demarketing Energy: Does Psychographic Research Hold the Answer?
Journal of the Academy of Marketing Science, Summer, 8, 3, 196-211.

Objectives: (1) To highlight and summarize the literature on demarketing strategy and activities; (2) to report on a pilot research study dealing with the energy crisis and relate it to demarketing; and (3) to identify specific strategy insights from demarketing analysis

Method: Five hundred mail questionnaires were sent to randomly selected households in Toledo, Ohio, and Detroit, Michigan, using the telephone directory as a source. Three hundred and three usable responses were returned. The questionnaire consisted of approximately 70 questions using checklists for demographics and Likert-type scaled responses for attitude, interest and opinion variables.

Variables: Dependent: attitudes, interests and opinions about travel, the energy crisis and energy-related behaviour

Independent: demographics

Findings/implications: The author concludes that: (1) consumers differ with respect to their attitudes and actions regarding energy conservation. The distribution of attitudes and opinions shows a great deal of variation among consumer groups in this respect. (2) It is important for interested parties to be aware of these differences and to trace variations to consumer types and profiles. (3) Marketing research in general and psychographics in particular can probe and systematically detect these different profiles.

2030

Fritzsche, David J.
1981 An Analysis of Energy Consumption Patterns by Stage of Family Life Cycle.
Journal of Marketing Research, 18, May, 227-232.

Objective: To examine the value of the family life cycle (FLC) as a predictor of energy consumption

Method: Sufficient data on 19,975 respondents were obtained from the 1972-73 Bureau of Labor Statistics' Consumer Expenditure Survey to permit classification by stage of family life cycle (using both the Wells and Gubar, 1966, and the Murphy and Staples, 1979, classifications). The data were analyzed by means of the SPSS, ANOVA program.

Variables: Dependent: total energy consumption per FLC category, energy consumption per FLC category by type of fuel consumer

Independent: stage in family life cycle, number of family members working

Findings/implications: Total energy consumption increases with each stage of the FLC up through Full Nest II; however, consumption begins to decline in the Full Nest III stage (when the youngest child is over six). Energy consumption rises slightly in the Mature Nest stage and then steadily declines through the remaining stages. Middle Age Single households consume less energy than those in any other stage except the Young Single. With the exception of gasoline, the Young Single stage of the FLC consumes the least amount of energy. The Middle Age Married with Children households use the most total energy of each type with the exception of fuel oil, wood and coal.

Middle Age Married with Children households appear to offer significant conservation opportunities, as would the vacation expenditures of the Young Married without Children and the Middle Age Married without Children households.

An obvious limitation to this study is that the data were collected prior to the 1973-74 oil embargo.

2405

Gardner, David M., James E. Cox, and John K. Wong
1980 A Proposed Model of Consumer Behavior for Study of Energy Consumption and Other Non-repetitive Purchase Decisions. Faculty working paper, College of Commerce and Business Administration, University of Illinois at Urbana-Champaign.

Abstract: A model of consumer behaviour appropriate to major energy decisions of consumers is important to guide research and understanding. This paper presents the rationale for such a model, the model itself and procedures for testing it. Areas of literature are reviewed to provide background: (1) energy specific consumer studies, (2) purchase and consumption of durables, and (3) variables associated with the nonrepetitive purchase process. The model proposed is for nonrepetitive purchase decisions, which differ on a number of dimensions from repetitive ones. The model considers information processing and information flows throughout all major stages of the model. The basic model structure includes: (1) trigger, (2) situation (information attributes), (3) decision process, (4) device strategies (influenced by joint decision strategies), and (5) purchase. Rather than specifically testing the model, the primary concern at present is to explore and establish the relationships or associations between the different variables which will be incorporated into the model.

Further testing, development and revision of the model are required.

2410

Gaskell, G., P. Ellis, and R. Pike
1981 Effects on Consumption Feedback.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 251-261.

Objectives: (1) To assess the effectiveness of three energy conservation strategies; (2) to explore the mechanisms which might account for changes in consumption as a result of the experimental treatments and define the characteristics of consumers who make substantial savings; and (3) to investigate the relations between attitudes and beliefs and overall consumption and changes in consumption

Method: This experiment, involving 165 households in Camden, England, consisted of the following phases: Phase I: preliminary interview; Phase II (8 weeks): four treatments: (1) information (I), (2) feedback (F) (daily gas and electricity usage, appliance record), (3) feedback and information (F&I), (4) control; Phase IIa: postexperiment interview; Phase III: 12-week assessment of longer-term effects. Subjects were not aware of Phase III.

Variables: Dependent: consumption of gas and electricity

Independent: sociodemographics; attitudes regarding the energy situation, values of individual efforts; knowledge about energy use and savings in the home; treatment

Findings/implications: For gas, subjects in all three experimental conditions made savings during the experiment period, with the F&I group making the greatest savings (-34%). In the 12-week monitoring period, savings were maintained in the F&I (-36%) and I (-22%) groups but not the F (+3%) group. For electricity, trends were similar; the I and F&I groups registered savings during the experiment (F increased 7%), with only the F&I group maintaining the savings afterwards. Reports of conservation measures taken during the experiment were consistent with the actual changes in consumption. There were some improvements in the economical use of energy and in the understanding of the comparative levels of consumption of different appliances for the F&I and I conditions. Most householders held proconservation attitudes before the study, and these changed only a very little after the experiment. The results suggest that beliefs are neither important antecedents nor powerful predictors of consumption levels. Substantial savings can be achieved by consumers who are motivated to cut back and know how to do so.

2415

Gaskell, G., P. Ellis, and R. Pike
n.d. The Energy Literate Consumer: The Effects of Consumption Feedback and Information on Beliefs, Knowledge and Behavior. Working paper, Department of Social Psychology, London School of Economics and Political Science, England.

Objective: To investigate three conservation strategies: feedback on energy consumption, specific information on energy savings, and the two in combination

Method: This eight-week field experiment involved 160 London households. Changes in energy consumption were monitored during the experimental period and twelve weeks after.

Variables: Dependent: energy consumption

Independent: the three conservation strategies, energy literacy

Findings/implications: All three experimental conditions resulted in some savings in gas consumption during the experimental period, with the greatest savings occurring in the combined feedback plus information condition (24%). The hypothesis that energy consumption is related to energy literacy was confirmed. The following implications were drawn: (1) general appeals to save energy are not likely to be effective; (2) specific information on energy saving is necessary but not sufficient to encourage energy conservation; and (3) feedback which enables the consumer to relate appliance use to total energy consumption is most effective.

2420

Geller, E. Scott
1981 Evaluating Energy Conservation Programs: Is Verbal Report Enough?
Journal of Consumer Research, 8, December, 331-335.

Objective: To evaluate the actual behavioural effects of a series of community-based energy-conservation workshops

Method: The workshops, conducted in 1977-78, provided information to participants. Subjects completed an attitude questionnaire immediately before and after taking part in the workshop, and were given a shower flow restriction device. For this evaluation, 40 workshop participants and 40 nonparticipants were visited in their homes. Water heaters were checked for temperature settings and the presence of insulation. Half the homes received an information kit. Six weeks later, those who had not insulated their water heaters prior to Visit I were revisited, and the information kit was presented to those who had not received one during Visit I. A third visit six weeks later was made to those given the kits during Visit II.

Variables: Dependent: presence of insulation on water heater, water heater thermostat setting, use of shower flow restriction device

Independent: workshop participant/nonparticipant

Findings/implications: Workshops significantly influenced attitudes, knowledge and behavioural intentions of the participants in the intended direction. However, the actual behavioural effects were negligible. Of 80 subjects, 4 had had insulation applied to their water heaters, and 2 of those had done so prior to the workshop. Only 6 had reduced the thermostat setting. There were few differences between those who had attended and those who had not. It would appear that information and education alone are not sufficient to motivate large-scale application of energy conservation strategies. An evaluation of an energy conservation program should include a behaviour validity check on verbal reports of program impact.

2425

Geller, E. Scott, John F. Ferguson, and William S. Brasted
1978 Attempts to Promote Residential Energy Conservation: Attitudinal versus Behavioral Outcomes.
Working paper, Department of Psychology, Virginia Polytechnic Institute and State University.

Objective: To provide an attitudinal and behavioural evaluation of a series of energy-conservation workshops sponsored by a Virginia organization, Community Education Model for Energy Conservation (CEMEC)

Method: Subjects (80) for the attitude/opinion measurement were voluntary attendants at one of seven CEMEC workshops (attitudes were measured before and after the workshop). For the behavioural follow-up, 40 subjects were selected from those attending the workshops, while 40 others were selected as a control group. These 80 subjects were interviewed at home and given information regarding insulating their water heaters (if not insulated). They were visited six weeks later to determine their reactions to the information. A third visit was made as well.

Variables: Dependent: attitudes and opinions re energy, energy conserving behaviour (notably re water heater thermostat setting, and installation of a water flow limiter device)

Independent: demographics, home characteristics, workshop/nonworkshop, insulation prompt

Findings/implications: Attitudes and/or opinions of workshop participants were influenced significantly by the workshop in planned and desired directions. Among the changes: (1) they became more concerned about the energy crisis; (2) they felt they could exert a greater positive impact on the energy crisis through their own actions; and (3) they became more aware that they had not done enough to insulate their homes. In general, there were no substantial behavioural changes effected by the CEMEC workshop. The prompt interventions had a minimal influence on the measures of action towards energy conservation. Comparisons between the workshop and control groups indicated few differences with regard to the application of conservation techniques. Workshops alone should not be relied on to promote energy conservation -- they should be supplemented with other techniques designed to motivate action.

2430

Gilbert, Gorman, and James F. Foerster
1977 The Importance of Attitudes in the Decision to Use Mass Transit.
Transportation, 6, 321-332.

Objective: To test the hypothesis that attitudinal variables are important in mode choice decisions and that they can significantly increase the explanatory power of network-based mode choice models

Method: The revealed preference approach is used to test the importance of various attitudinal variables with regard to data collected in the town of Chapel Hill, North Carolina. Before and after surveys (N = 1,700) were conducted prior to, and after, the initiation of a municipally owned and operated bus system in Chapel Hill on August 1, 1974. The "after" survey asked respondents to indicate their agreement with 12 attitudes on Likert-type scales. The subjects were selected from the 603 respondents to the "after" survey; there were 144 usable responses remaining.

Variables: Dependent: mode choice decisions

Independent: attitudes, perceptions

Findings/implications: Some attitudinal variables are important in mode choice decisions, while others are not. The results also indicate that perceptions are important as explanatory variables. The major finding is that both attitudes and perceptions are important in the decision to use mass transit.

2435

Gilly, Mary C., and Betsy D. Gelb
1978 Marketing Energy Conservation.
Journal of Home Economics, Winter, 31-33.

Abstract: Contending that energy conservation, much like any other product, must be marketed through the use of sound marketing principles, the authors focus on the specific marketing tool of segmentation. They review four common bases for segmentation (state of being, state of mind, usage and benefit) and four means of analyzing segments (questioning, observation, statistical techniques and experimentation). When segmentation is applied to energy conservation, just as with any other product, the segment must be identifiable, accessible, large enough to be worth a distinct effort, and responsive to a distinct marketing program. Applications of segmentation to energy conservation are then discussed.

2440

Gladhart, Peter M., James J. Zuiches, and Bonnie M. Morrison
1978 Impacts of Rising Prices upon Residential Energy Consumption, Attitudes, and Conservation Policy Acceptance.
In S. Warkov, ed., Energy Policy in the United States: Social and Behavioral Dimensions. New York: Praeger Publishers.

Objective: To investigate the relationship between various household features and residential energy consumption and policy acceptance

Method: Respondents (264) completed a self-administered questionnaire in 1976. Fuel consumption data were collected from energy supply companies (for 194 families).

Variables: Dependent: fuel consumption

Independent: attitudes and beliefs about the energy problem, energy conservation behaviour, demographics, dwelling characteristics

Findings/implications: Size and type of family as well as a number of dwelling characteristics made contributions to energy consumption. Elasticity for family size was .20. Calculated price elasticity was -.37. Although fuel oil users were paying more for their energy, they did not report making any greater effort to conserve. There was some evidence, however, that over a longer period they had made more adjustments, since fuel oil prices had jumped a year or two before the prices had for other sources. Persons with higher levels of understanding and concern for the energy situation tended to have lower rates of energy usage. Higher energy prices may have contributed to alienation from the energy situation rather than to an understanding and acceptance of it. Belief in the reality of the energy problem differentiated acceptors from nonacceptors of policies most sharply. The proportion who believed in the problem was not vastly different from that as measured in a 1974 study, but believers had generally increased their acceptance of policy options over the two years.

2445

GMA Research Corporation
1979 Oregon Residential Energy Conservation Survey.
Prepared for the Oregon Department of Energy.

Objectives: To measure and determine: (1) the level of participation in energy conservation activities by Oregon residents and the motivators of these actions; and (2) the attitudes and opinions of residents towards energy conservation in Oregon

Method: Interviewees were prescreened by telephone. In-home interviews were subsequently completed with 856 residents across Oregon.

Variables: Dependent: attitudes towards energy and energy conservation, awareness and use of energy conservation programs, conservation actions taken and planned, insulation characteristics of houses, appliance ownership

Independent: demographics

Findings/implications: Residents want the government to first of all keep energy prices as low as possible (17% feel this is the most important thing government can do with regard to energy for homes). Other actions mentioned include tax rebates on insulation (14%) and educating people (10%). Middle-aged, upper income and owners of property are more likely to be aware of government energy programs. A majority (85%) had not used any of the programs. About half (52%) took at least one conservation action for their residence in 1978. They tended to be younger with higher incomes than those not taking actions. Nearly half (47%) planned to take no such actions in 1979. Those who had not taken action, most frequently mentioned high cost/lack of funds as their reason for not doing anything. Nonelectric fuel sources are more prevalent in Oregon (64% of residences). Natural gas (29%) and fuel oil (25%) were the two most popular sources. Electric ranges, washing machines, clothes dryers and colour televisions were the most frequently used major appliances. More than 60% have frost-free refrigerators or dishwashers. Almost 90% said they were not considering installing an alternative energy source in their home within the next few years (solar, wind, geothermal).

2450

Good, Walter S.

1979 Canadian Attitudes Toward Energy Conservation: Implications for Public Policymakers.
In Frey, Kinnear and Reece, eds., Public Policy Issues in Marketing. Ann Arbor: Division of Research, Graduate School of Business Administration, The University of Michigan.

Objectives: (1) To develop a profile of the energy-conscious consumer; and (2) to indicate to policymakers the types of marketing strategies most likely to appeal to that consumer segment

Method: Questionnaires were mailed to 1,500 subjects in each of two populations in six Canadian urban centres. The populations were: (1) all Canadians, and (2) consumers who had requested a government-published how-to-save energy booklet. Returns were: (1) 451 and (2) 619.

Variables: Dependent: group membership ("energy-conscious vs. non-energy-conscious")

Multiple discriminant analysis was used to discriminate between the two groups.

Independent: lifestyle/psychographics, demographics, attitudes towards energy, exposure to and interest in print and broadcast media

Findings/implications: Energy-conscious consumers are more cosmopolitan and are more likely to believe they can affect the nation's energy use through their individual efforts. It is estimated that 34% of the population is "energy-conscious." Demographics do not discriminate between the two groups. It would appear that indirect policy interventions would be more acceptable to consumers. Policymakers should be aware that opinions expressed by more vocal elements are not necessarily representative of the general population. Socially responsible attitudes should not be equated with socially responsible behaviour.

2455

Gradin, Rolf, and C. Dennis Anderson
1981 International Perspective on Energy Conservation. In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 180-192.

Abstract: The paper presents an overview of energy conservation programs in the 21 member countries of the International Energy Agency (IEA). Some of the more important measures taken by most countries include: (1) publicity campaigns informing people of the need and means to save energy, (2) pricing measures to encourage energy conservation, (3) incentives to make investments leading to conservation, and (4) standards establishing minimum energy efficiencies. There is a continuing need for motivation -- explaining why energy conservation is necessary. Since 1973 those countries with the highest increases in real energy prices have shown the greatest improvements in energy efficiency. Progress in implementing programs has been less than expected and the success of some measures less than foreseen. Strengthened policy actions are needed, as are increased exchanges of information between countries and more evaluation and research studies.

2460

Graef, Ronald, Susan M. Gianinno, and Mihaly Csikszentmihalyi
1981 Energy Consumption in Leisure and Perceived Happiness. In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 47-55.

Objective: To compare a measure of individual energy use in leisure activities with a measure of individual happiness

Method: One hundred and twenty-five employees at five companies in Chicago took part, with 107 completing the project. Data were collected with the Experience Sampling Method (ESM), in which subjects are randomly electronically paged, and respond to structured items about their activity. Paging was done over a seven-day period, during working hours. Each subject received about 56 signals during the week.

Variables: Dependent: quality of ongoing experience (measured by average happiness ratings)

Independent: energy consumption in leisure activity (low, medium, high, as measured by Fritsch's Lifestyle Index)

Findings/implications: Leisure activities requiring more energy consumption did not produce higher levels of satisfaction than those requiring less. As well, the more energy intensive a person's leisure experiences, the less happy that person tends to be, overall. Other correlates of energy-intensive activities include: age (older), marital status (married), income (higher), frequency of obligatory activities, lower job satisfaction and lower self-image. Lower-energy activities tend to involve the participant on a more active basis.

2465

Greene, Thomas C., and Paul A. Bell
1980 Additional Considerations Concerning the Effects of 'Warm' and 'Cool' Wall Colours on Energy Conservation. Ergonomics, 23, 10, 949-954.

Objective: To determine the effect of wall colours on perceptions of thermal comfort.

Method: The study used 72 male and 72 female undergraduate college students, each of whom was put in a carrel with one of the possible combinations of three wall colours and four room temperatures. A 2 x 3 x 4 factorial design was employed.

Variables: Dependent: emotional reponses (pleasure, arousal, dominance), cool-warm feelings; personal feelings (positive-negative), judgement of environmental quality, heart rate, room temperature report

Independent: wall colours (red, white, blue), ambient room temperature (18°, 22°, 29° or 35°C)

Findings/implications: Both room temperature and room colour influenced subjective feelings, but colour had no effect on perceived temperature. The study failed to demonstrate any potential energy-saving value of the hue-heat hypothesis.

2470

Greenlees, John S.
1980 Gasoline Prices and Purchases of New Automobiles.
Southern Economic Journal, 47, 1, 167-178.

Objective: To measure the impact of the price of gasoline on the mix of new automobile purchases

Method: The conditional logit choice model is used to analyze auto purchase decisions. New car purchases (1,257) between January 1971 and March 1974 are used in the data analysis. Gasoline prices were obtained from the Bureau of Labor Statistics and were adjusted to the general price index.

Variables: Dependent: size of auto purchased (four, six or eight cylinder)

Independent: real gasoline prices, demographics, number of cars in household, region

Findings/implications: Probabilities of purchasing a four, six, or eight cylinder car for a "representative family" are 14.5%, 18.5% and 67% respectively. With a gasoline price increase of 10%, the probability of buying a four cylinder car increases 8%. A rise in pretax income of 10% increases P(8) to 68%. If the family is purchasing the car as its only automobile, P(4) = 8.7% and P(6) = 13.1%. There is no difference between city and rural purchases. As age rises to 65 from 25, P(4) decreases from 27.7% to 7.0%, and P(8) rises from 53.7% to 76.3%. There are regional differences: in the West P(8) = 41.3%, vs. 67.3% in the South. Individuals tend to purchase the same type of car they are replacing: for eight cylinder families, probabilities of buying a four, six, or eight cylinder are 8.6%, 13.4% and 77.9%. For a four cylinder family, probabilities are 40.6%, 19.1% and 40.3% respectively. The results would seem to be evidence of a strong cross-elasticity of small car demand to the price of gasoline.

2805

Hake, Don F., and Richard M. Foxx
1978 Promoting Gasoline Conservation: The Effects of Reinforcement Schedule, A Leader, and Self-recording. Behavior Modification, 2, 3, 339-369.

Objective: To investigate the effects of reinforcement and self-recording on driver behaviour

Method: Driving behaviour was monitored for four weeks as baseline, for four weeks during treatment and for a further four weeks post-treatment. Subjects (N = 17) were assigned to one of two treatments. In (1) reinforcement, monetary rewards were contingent on decreasing average daily mileage. Weekly and monthly prizes were awarded. Four of the subjects received experiment instructions from their course instructor (leader variable). In (2) self-recording, monetary rewards were contingent on keeping a daily record of mileage. To qualify for the study, subjects had to do all driving in one car, and less than 5% of the driving for that car could be done by other persons. Odometers were checked five times during baseline and twice a week during treatment. A poststudy questionnaire was completed by all subjects.

Variables: Dependent: miles driven per week

Independent: treatment

Findings/implications: On the average, the reinforcement group reduced mileage 22.5% during treatment. Those influenced by the leader reduced mileage 40%, while those not influenced reduced mileage 8%. The self-recording group reduced mileage 10.4% on the average. Strategies reported included taking shorter routes, reducing unnecessary driving, carpooling and combining trips. Results suggest that a 20% reduction in driving is not an unreasonable goal. The leader variable appears to play a role in motivating individuals to participate in a program. Programs designed to reduce mileage should include only drivers who do considerable driving (in excess of 40 miles per day). An obvious setting for such a program is a company or institution where the leader variable exists naturally, and reinforcers are available (days off, preferential work schedules, etc.).

2810

Halvorsen, Robert
1975 Residential Demand for Electric Energy.
Review of Economics, 57, 12-18.

Abstract: The author develops a model to examine the determinants of residential demand for electric energy. The model permits consistent estimation of direct and total elasticities of demand for residential electricity. The author concludes that, contrary to the common belief, demand is not responsive to price; the long-run own-price elasticity of demand is equal to at least unity. The results indicate that the historic growth of residential electricity demand is attributable to its decline in real price. Likely future changes in the real price of electricity will cause long-run forecasts of electricity demand based on historic growth rates to be far too high.

2815

Hamby, Robert
1980 Energy Conservation Audit Programs.
Energy Engineering, 77, 4, 33-37.

Abstract: This report describes three audit programs of the Tennessee Valley Authority (TVA). The house insulation program, begun in August 1977, offers free on-site inspections as well as no-interest loans for weatherization. By January 1980, over 183,000 homes had been surveyed and 112,000 loans granted. The heat pump financing program was instituted, in part, because 45% of TVA's customers heat electrically (vs. 9% nationally). Participants must first go through the home inspection and carry out all recommendations. Low-interest loans are offered for heat pump purchases. By January 1980, 3,841 heat pump surveys had been carried out and 1,354 loans made. The commercial and industrial energy conservation program offers free audits and low-interest financing (for measures that will save electricity). An Energy Management Survey Report is provided listing opportunities for eliminating energy waste. Financing discriminates between profit-making and nonprofit-making customers. For all programs, work is inspected and it must meet TVA standards before payment is made.

2820

Hannon, Bruce, and Robert Herendeen

1980 A Rebated Energy Conservation Tax.
Presented at conference, The Dependence Dilemma: U.S. Gasoline Consumption and America's Security, Harvard University, March.

Objective: To examine the effects of an energy tax-rebate on energy conservation, and employment and income

Method: An engineering econometric model is used to estimate the effects of the tax. Data utilized are from 1977.

Variables: Dependent: change in consumer price index, change in energy use (coal, crude oil and natural gas, refined petroleum, electricity, natural gas); change in employment demand

Independent: energy tax

Findings/implications: With a tax rate of $1.00 per million BTU, total energy use would be reduced by 15.1%. The tax rate would increase gasoline prices by 20%, but natural gas prices would increase over 100%. The consumer price index would rise 5%. Changes in energy use for each form would be: coal, -29.7%; crude oil and natural gas, -21.2%; refined petroleum, -15.7%; electricity, +20.9%; and natural gas, -24.4%. The consumer sector would account for 5.3% of the 15.1% decrease and industry would account for the other 9.8%. An income-preserving rebate would be distributed to households, maintaining present income distribution. This would allow employment to rise 0.41%.

2825

Hannon, Bruce, Robert Herendeen, and Peter Penner
1979 An Energy Conservation Tax: Impacts and Policy Implications. Report to the Council on Environmental Quality.

Objective: To examine the potential of an energy tax-rebate system for reducing U.S. energy use and increasing the demand for jobs

Method: An input-output policy model is used to analyze data obtained from the Bureau of Economic Analysis. Various scenarios are studied, based on 1967 levels of economic activity and industrial structure. Energy taxes placed on all fuels at "wellhead" are rebated to consumers.

Variables: Dependent: change in consumer price index, energy demand changes, employment demand changes

Independent: tax rate

Findings/implications: Consumers shift purchases to less energy-intensive and more labour-intensive goods. When both consumers and industry adjust to an energy tax of $.60 per million BTU, energy demand is reduced by 6.5% of 1967 total energy use and 280,000 new jobs (.4% of the 1967 labour force) are created. More jobs would be created if the industrial structure is assumed unchanged by the energy tax. An energy tax-rebate plan could be used to conserve energy and increase employment without significant adverse aggregate economic impacts.

2830

Hardin, Garrett
1979 Imperatives of the Conserver Society.
In Karl Henion and Thomas Kinnear, eds., The Conserver Society. American Marketing Association.

Abstract: We are now on our way to becoming a conserver society, in which we strive for a minimization of turnover of goods and a maximization of lingering enjoyment. Part of this move involves a change in attitude towards energy. Ramifications of this change are many, one of which may be a serious attack on the tourist industry. Escalation of the energy shortage will inhibit travel, which will help preserve the world's variety and beauty. A conserver society will be controlled by bureaucracies, unlike its predecessor, the "go-go" society, which is controlled by market forces. Some things will remain unchanged: the cardinal rule of policy will still be, "Never ask people to act against their own self-interests"; competition will be the powerful conserver of excellence.

2835

Harris, Craig K., and Joanne G. Keith
1980 Preliminary Findings on the Evaluation of Pilot Project Conserve in Michigan.
Prepared for Michigan Energy Administration, Lansing.

Objective: To present a preliminary evaluation of a Michigan computerized residential energy audit program

Method: Pilot Project Conserve was conducted in 15 Michigan counties during the winter of 1977-78. A total of 110,000 questionnaires were distributed, with 12,662 responses. The evaluation design included five groups of households (200 subjects per group); telephone interviews were conducted in April 1978, and reinterviews in June 1979. Actual consumption was monitored for the seasons prior to, during and after participation in the program.

Variables: Dependent: energy-related attitudes, knowledge and behaviour; actual energy consumption

Independent: group: (1) direct mail participants (received questionnaire by mail and returned it); (2) volunteer participants; (3) direct mail nonparticipants; (4) control group within target area (were not contacted by Project Conserve); (5) control group outside target area

Findings/implications: The entire sample of households reduced their consumption by 5.4%. Participants reduced consumption 6%, control groups about 4% and nonparticipants 2%. Of the actions which have the largest impact on space heating, only two were reported by more than 75% of the households: setting daytime temperature at 69°F, and installing storm doors or windows. A sizeable potential for the adoption of additional conservation measures is indicated. There was no significant difference between participants and nonparticipants with regard to levels of knowledge of the benefits of conservation measures, or the adoption of conservation measures and behaviour. This particular project was not the only conservation campaign underway in Michigan at the time. Further analysis is required to isolate the factors which contribute to the reduction in energy consumption. Estimated savings for all participants (based on the reduction in consumption beyond that of control) was approximately $145,000, while the cost of the program was $106,000.

2840

Hartgen, David T., and Nathan S. Erlbaurn

1980 Transportation Energy Impact Assessment Methods: Current Capabilities and Future Needs.
Preliminary research report for the Planning Research Unit, New York State Department of Transportation, Albany.

Abstract: This paper provides an assessment and review of the state of the art in transportation energy impact assessment methods. The authors assert that the major area lacking data is the consumer response area, particularly dealing with consumer response to rationing. The review indicates that many technical studies on transportation energy impact assessment have been conducted, but that the results have not been disseminated as widely as possible.

2845

Hartgen, David T., and Alfred J. Neveu
1980 The 1979 Energy Crisis: Who Conserved How Much?
New York State Department of Transportation, Albany.

Objective: To determine what the public response (in actual savings) to reductions in the supply of gasoline has been so far and is likely to be in the future

Method: A total of 1,520 New York State households were surveyed in October 1979 as to their conservation actions with regard to travel since January 1979. The data obtained were used to quantify energy savings.

Variables: Dependent: actions taken to cope with fuel prices/shortfalls; intended responses if: (a) gasoline prices rose to $1.50/gallon, or (b) shortfalls ran to 20% (in 1979 they were 11.13%)

Independent: region, age, gender, car ownership, household size, household income

Findings/implications: Consumers emphasized small/frequent actions (driving slower, 42%; tune-up, 37%) rather than major actions (move closer to work, 3%; eliminate recreational vehicle/boat, 9%). A significant percentage did take some major actions (cancel vacation, 16%; buy more fuel-efficient car, 15%; other mode for vacation, 16%). Certain major actions would increase in incidence if gasoline prices were $1.50/gallon, as they would if shortfalls ran to 20%. Nearly 300 million gallons of gasoline were saved by New York State residents during January--October 1979, of which 44% was car-related -- purchasing or selling. At $1.50/gallon, total savings would rise to 320 million gallons, and the proportion attributable to the car would rise to 46%. Transit is responsible for more savings in those areas (New York City) where it is already available. That elderly persons account for little of the savings is not surprising, given the amount they travel (no work travel). Energy savings are split almost equally between men and women. Households with more than two cars were responsible for half the gasoline conserved by New York State residents in 1979. Middle- and higher-income groups accounted for nearly 90% of the savings. Government should expand the options available to consumers and make them available to more people. Consumers will choose actions which are in their own best interests, minimize mobility loss, build on prior actions and are economically viable to them personally.

2850

Hartgen, David, et al.
1979 Guidelines for Transportation Energy Contingency Planning. Report no. 157, New York State Department of Transportation, Albany.

Abstract: This paper sets out guidelines and suggestions for energy planning. Any such planning must be guided by likely public response, and actions taken must be consistent with the crisis level, effective and fair. Public response to the 1973-74 crisis was largely determined by restrictions of supply rather than price increases. Measures supported include the 55 mph speed limit, rather than rationing or increasing prices. Three scenarios, varying in price and supply shortfall (Relax, Muddle, Crisis), are examined. Appropriateness of actions will depend on: (1) public receptiveness, (2) responsibility and capability for implementation by government, (3) effectiveness of action, (4) impact on society;, and 5) time frame. Actions are suggested for each government level for the three scenarios. Gasoline supply shortfalls as high as 15% could be handled without major changes in lifestyle, with prior planning and with the full use of existing facilities and knowledge.

2855

Hartgen, David

1978 Applications of Behavioral Sciences to Issues in Transportation Planning.
New York State Department of Transportation, Albany.

Abstract: This paper investigates the potential for applying methods and concepts in the behavioural sciences to transportation planning. Some behavioural science methods, particularly from sociology, psychology and social psychology, have been used to date in transportation. In regards to energy, a considerable amount of research has been published on the nature of energy constraints and on the effectiveness of various energy conservation options in the transportation sector. Research is needed on how travel behaviour is likely to change in response to a variety of energy conservation incentives and disincentives. Individuals' perceptions of the crisis need to be understood, as do attitude-behaviour linkages. Interaction between transportation and the behavioural sciences should be encouraged and established at numerous methodological and conceptual points.

2860

Hassoun, Virginia S., and Fern E. Hunt
1980 Electric Energy Usage in the Home: A Predictive Model. Home Economics Research Journal, 8, 4, 252-260.

Objective: To develop a predictive model for the total electric energy (in kilowatt hours) used in the operation of homes not heated electrically or cooled with central air conditioning

Method: Data were gathered from a subsample of participants in a larger research project in and around Columbus, Ohio. The sample was limited to the single-family house, satisfying a number of criteria (such as no electrically heated units, same address for two years, etc.). Final sample size was 195. In-home interviews were conducted in April-May 1976. Actual electricity usage data were obtained from electric utilities.

Variables: Dependent: electricity consumption

Independent: appliance ownership, income and size of household, education and age of householder, housing tenure, residence location, hours per week working outside home, knowledge of electricity concepts and terms

Multiple regression analysis was conducted

Findings/implications: The final predictive equation obtained was: $Y_1 = -249 + 672X_1 + 3463X_2 + 925X_3 + 25X_4$ where Y_1 = predicted electric usage (kW·h), X_1 = number of electric major appliances, X_2 = water heater type, X_3 = household size and X_4 = number of hours per week home manager employed outside the house. Total variance explained was 54%. Variance explained by independent variables was 24%, 18%, 11% and 1% respectively. Appliances were grouped and analyzed, and in order of importance in explaining the variance, significant groups were: electric water heater; clothes washer; dishwasher and electric clothes dryer; refrigerator and freezer; electric furnace units, ovens; air conditioners, humidifiers. It is interesting to note that the more hours per week the respondent was employed outside the home, the greater was the amount of electricity used. No significant relationship was found between location (rural/urban) and electricity usage. Perhaps more careful investigation of the relationships between the independent variables which appear to be related to energy usage is required.

2865

Hayes, Steven C., and John D. Cone
1981 Reduction of Residential Consumption of Electricity Through Simple Monthly Feedback.
Journal of Applied Behavior Analysis, 14, 1, 81-88.

Objective: To examine the effects of monthly feedback on the consumption of electricity

Method: The study involved 40 families (nonvolunteer) in Rhode Island, and took place during the winter and spring of 1976. Half of the families were baseline-only control, as only their consumption was monitored. The other 20 were sent monthly feedback letters, for five months.

Variables: Dependent: raw kilowatt hour consumption, percentage change scores (from average consumption for that month in 1973 and 1974)

Independent: treatment (letter reported the percentage change in consumption over the same month during baseline, showing both kilowatt hours and dollars involved)

Findings/implications: Subjects receiving feedback consumed 4.7% less electricity than during comparable periods in 1973 and 1974, while control subjects increased consumption by 2.3%. When feedback was withdrawn, feedback subjects used 11.3% more electricity than in 1973-74. Monetary savings during the feedback phase amounted to about $4 per customer. The clear results of this study may be affected by types of consumption (electric space or water heating was rare). Savings by consumers constitute revenue losses to utilities, so utilities may not be apt to encourage conservation.

2870

Haynes, J.J., J.N. Fox, and B.T. Williams
n.d. Public Attitudes Toward Transit Features and Systems.

Objectives: (1) To determine the human design factors that the public desires in public transportation systems; (2) to determine what type of overall system people prefer; and (3) to identify the underlying factors that influence regional attitude and behaviour patterns in the decision to ride or not ride any public transit system

Method: An attitudinal survey was conducted in the Dallas-Fort Worth metropolitan area in 1973-74. The sample was slightly upscale ($12,500 mean income in comparison with an income of $12,000 for census-data population). Roughly 30% of the sample used public transportation and 10% carpooled to work.

Variables: Dependent: attitudes towards transit issues

Independent: socioeconomic and demographic variables, various (26) public transit design features, five transit systems

Findings/implications: It was found that there was general apathy towards mass transit in the Dallas-Fort Worth area, resulting in the conclusion that no matter which public transit system is implemented it will be equally attractive for most segments of the population. People see a long-term need for mass transit but at present are unwilling to give up or reduce usage of their automobile.

2875

Heberlein, Thomas A., Daniel Linz, and Bonnie P. Ortiz
1981 Time-of-Day Electricity Pricing.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 194-204.

Objective: To examine public acceptance of nontraditional electricity rates

Method: Treatments involved three peak lengths (6, 9, and 12 hours) and three price ratios (2:4, 4:1 and 8:1 — i.e., for 8:1, the off-peak charge was one-eighth that of the peak charge). The 363 households in northeast Wisconsin that participated, experienced time-of-day (TOD) pricing from spring 1977 to March 1979, after a baseline monitoring during 1976-77. In March 1979, questionnaires were mailed to the households, with 329 being returned in usable form. Participation in the pricing experiment was mandatory.

Variables: Dependent: overall satisfaction, perceptions regarding the fairness and reasonableness of the rates, knowledge about the pricing schemes, reported behaviour

Independent: treatment (there were nine in all), income, size of household, house value, education

Findings/implications: Fifty-two per cent were satisfied with the rates, 17% were neutral and 30% were dissatisfied, of which less than 10% were extremely dissatisfied. Slightly over 60% felt that the rates were more fair than their old rates. Almost 75% said it was reasonable to cope with time-of-day pricing. Satisfaction did not vary across price ratio groups. Those in the six-hour peak group were less satisfied than those in the other two. About 70% felt that potential savings were worth the effort of shifting consumption to off-peak hours. Persons who perceived savings as being greater were generally more satisfied with the experimental rates (this may explain the lower satisfaction of the six-hour group). Over one-third of the families did not know the exact peak hours they were on. Ninety-five per cent reported attempts to reduce on peak usage. Length of peak period had no effect on commitment; however, those on lower price ratios (2:1) were less committed (to TOD pricing). Thus longer peaks and higher price ratios would seem to yield more satisfaction and commitment. A greater effort should have been made to inform participants about the peak hours.

2880

Hirst, Eric

1980 The Importance of Evaluating DOE Energy Conservation Programs.

Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Abstract: Evaluation is vital to: (1) improve the management and productivity of Department of Energy (DOE) programs, and (2) assess the overall worth of the programs. Evaluation should be part of the management system (analysis, design, implementation, evaluation and back to analysis). First, DOE should select programs for evaluation which are important and/or typical of many others. Second, program managers must be interested in the existence, quality and relevance of the evaluation. Third, the evaluation must be feasible and, therefore, the effects of the program must be measurable. As for the evaluation itself, the first step should be to articulate program goals as a yardstick against which performance can be measured. Data from both participants and nonparticipants (as a control) have to be collected to measure the success/failure of a program. The data must be carefully analyzed and interpreted. Evaluation findings should be reviewed with program management and staff before final presentation, as without this participation, no improvement can take place. Problems likely to arise include lack of clear program definition, poor program records and difficulty in obtaining data on disaggregate energy use. Recommendations of this report include: (1) a substantive evaluation system should be instituted throughout DOE; (2) DOE should make a commitment to carefully examine and use evaluation results; (3) sufficient resources must be made available to conduct careful and useful evaluations -- including devoting attention to the collection of energy use and related data from individual energy consumers, as data quality is a key element in the conduct of a successful evaluation.

2885

Hirst, Eric
1980 Engineering Audits at State-Owned Buildings in Minnesota. ASHRAE Journal, June, 47-49.

Abstract: Discussed are engineering audits performed at 270 state buildings, including community colleges, hospitals and office buildings. Over 2,000 individual energy conservation opportunities were recommended. Implementing all recommendations would cut energy use by 71 thousand BTU/ft.^{2} audited, which is equivalent to at least 32% of total energy use at these institutions. About 85% of the savings is in fossil fuels. The average payback period is less than 8 years (1978 fuel prices), but 60% of the savings could be achieved by implementing only those measures with a payback period of less than 5 years. Cost effectiveness of the measures is a strong function of the type of measure -- heating, ventilation and air conditioning (HVAC) measures have very short payback periods, while envelope measures have very long (23 years) paybacks.

2890

Hirst, Eric, and Peter Lazare
1981 Minnesota Computerized Home Energy Audit Program. In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 262-270.

Objective: To discuss an evaluation of Project Conserve (PC), a program in which the Northern States Power Company (NSP) offered a computerized home energy audit to all its 540,000 residential customers living in structures with one to three dwelling units

Method: The evaluation contained three elements: (1) data from all 91,000 who returned the 67-question form were analyzed to determine the characteristics and energy conservation potentials of their homes; (2) mail surveys (2,200) were distributed to PC participants and nonparticipants (1,100 to each); (3) visits were made to 312 homes to complete the audit (again, half the homes had participated in PC). The engineering analysis develops estimates of fuel use for each home and estimates of potential energy savings for several conservation measures.

Variables: Dependent: past and planned conservation actions, reason for conservation actions

Independent: energy-related characteristics of home; appliance ownership, demographics

Findings/implications: The strongest motivation for conserving actions was rising fuel costs, followed by concern over decreasing energy supplies. PC was generally ranked as the fourth or fifth reason, and it would appear that PC played a limited role in motivating participants to take conservation actions. The results from the home characteristics information suggest that there were considerable conservation potentials in existing single-family homes. The participants in PC were very similar to nonparticipants in terms of demographics, home features, annual fuel bills and appliance ownership. The cost-effectiveness of Project Conserve is not clear, as the benefits are difficult to isolate.

2895

Hirst, Eric, Robert Maier, and Michael Patton
1981 Evaluation of Telephone Energy Conservation Information Centers in Minnesota.
Journal of Environmental Systems, 10, 3, 229-248.

Objective: To evaluate two telephone energy conservation information "hotlines," one operated by the Minnesota Energy Agency (MEA) and the other by the Northern States Power Company (NSP)

Method: The MEA service was begun in 1976, and the NSP program in 1977. Hotline records were reviewed to provide an understanding of the operational dynamics of the programs. An initial telephone survey was conducted, contacting users within weeks of their call to the service. A second survey contacted callers and noncallers. Total callers contacted was 547, and total noncallers, 270. Complete fuel records were obtained for 257 of the households for 1977-78 and 1978-79.

Variables: Dependent: demographics, assessment of hotline service, conservation actions taken, influence of hotline on actions, energy savings

Independent: caller vs. noncaller

Findings/implications: Over 40,000 calls were handled by the two services in 1979. Callers were more likely to be more highly educated, of higher incomes, and single-family homeowner occupants than were noncallers. In general, callers gave the services a positive evaluation. Nearly 80% found the information somewhat/very useful, and over 90% said the person they spoke with was helpful and courteous. Hotline callers were more likely to have reported a number of conservation actions, including: weatherstripped, installed attic/wall insulation, installed storm doors/windows, and bought energy-efficient appliances. Seventeen per cent of the MEA callers and 30% of the NSP callers said that the hotline had influenced their decision to take at least some of their actions. The overall energy savings (based on engineering estimates of results of actions reported) were: MEA callers, 14.1%; NSP callers, 14.3%; and noncallers, 11.8%. Actual energy use data did not support the hypothesis that callers use less energy (there was no statistically significant difference between callers and noncallers in terms of actual energy use). Technical changes (retrofitting) may be offset by behavioural change (increasing thermostat settings to increase comfort). A number of recommendations for the hotline services are made.

2900

Hirst, Eric, and Raj Talwar

1980 Evaluation of the Low-Income Weatherization Program in Minnesota.
Prepared for the Minnesota Energy Agency, the Mid-American Solar Energy Center, and the Office of Conservation and Solar Energy, U.S. Department of Energy.

Objective: To determine the actual energy savings that can be attributed to a low-income weatherization program

Method: The program offers financial assistance to low-income homeowners for retrofitting their homes. Those included in the sample group had completed weatherization before the 1978-79 heating season. Members of the control group were eligible for weatherization but had not started it at that time. Questionnaires were distributed to 178 sample households and 169 control households. Fuel use data were obtained from energy suppliers. The final analysis was based on 96 cases (59 sample, 37 control).

Variables: Dependent: energy savings: percentage BTUs saved, dollars saved per degree day, BTUs saved per degree day per square foot of living space

Independent: household characteristics, weatherization actions performed, participant attitudes

Findings/implications: There were errors and discrepancies in the fuel use records for a large number of cases, restricting the analysis to 96 households. Energy savings were normalized with respect to the severity of the heating seasons used for comparison. Most of the homeowners who took part in the program were satisfied with it. Almost 70% indicated plans for further weatherization. Energy savings of the sample group (after adjustment for control group changes) were: (1) BTUs saved, 13.4%; (2) dollars saved per degree day, .007. Based on 1979 fuel prices, savings amounted to about $60 per year. The payback period for weatherization is thus 3.5 years. Over one-third (35%) of the householders indicated that after weatherization they raised their wintertime thermostat settings, thus increasing their level of comfort. Such lifestyle improvements cannot be ignored in any evaluation.

2905

Hirst, Eric
1979 Reducing Residential Energy Growth.
ASHRAE Journal, January, 44-46.

Objective: To evaluate the energy and direct economic effects of four different futures

Method: The Oak Ridge National Laboratories (ORNL) model of residential energy use is used in the evaluation.

Variables: Dependent: energy use

Independent: futures: (1) baseline; (2) the conservation program as authorized by the 94th Congress, which includes appliance efficiency targets, thermal performance standards and retrofit programs; (3) a research and development scenario which allows for the introduction of more efficient systems (e.g., gas-fired heat pumps); and (4) a scenario which allows for the selection of the mix of equipment and structures which minimizes life cycle cost to consumers beginning in 1980

Findings/implications: A combination of the scenarios suggests that a minimum energy growth future (0.4% per year) is feasible both technologically and economically. The cumulative energy saving from 1977 to 2000 is 92 QBTU,* and the net economic benefit is $54 billion. This may not be a likely future for residential energy use. Required would be: strong public support; continued research and development programs; education-related choices; cooperation between all groups involved in the various facets of residential design, construction and financing; and building and equipment efficiency regulations. The analysis does underline the potential benefits of effective conservation programs.

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*1 QBTU = quad = 10 BTU

2910

Humphries, D. Keith, Robert W. Joselyn, and Dan H. Robertson
n.d. The Hidden Bias in Recent Travel Research: The Gasoline Crisis.

Abstract: This article, written during the energy crisis of 1973-74, points out that travel research conducted at, or after, that time must consider the effects of the gasoline crisis. "Hard data" such as traffic counts and occupancy counts will be affected. The authors also address ways of overcoming biases introduced by the energy crisis. Their suggested solution involves trying to "normalize" the new data. The issue of a new state of normalcy is not addressed.

2915

Hydro-Quebec
1979 Residential Saturation Survey.
Marketing Research Department.

Objective: To update trends in appliance ownership so as to be able to forecast electricity needs and make a realistic assessment of energy conservation possibilities

Method: Surveys were mailed to over 68,000 residential customers across Quebec. Almost 43,000 usable responses were obtained.

Variables: Dependent: electricity usage

Independent: appliance ownership and usage, home characteristics

Findings/implications: The penetration rate of various major appliances, for 1979 and 1976, was: electric water heaters, 71% and 66%; electric clothes dryers, 65% and 56%; frost-free refrigerators, 58% and 32% (the latter may be an underestimation); colour television sets, 76% and 58%; and dishwashers, 29% and 19%.

3205

Idaho Power Company
1979 Residential Appliance Survey.
Planning and Resources Department.

Objective: To obtain information on the number and types of appliances in customers' homes so as to properly assess the impact of changes in the pattern of use of electricity in Idaho

Method: Surveys were distributed by mail to 5,000 customers, with 2,420 questionnaires returned in usable form.

Variables: Home characteristics, heating system, food preparation and preservation, comfort cooling, laundry and dishwashing equipment, conservation actions taken, willingness to have load survey meter installed

Findings/implications: Approximately 37% of the homes were heated by electricity. Major appliances and their saturation levels were: self-cleaning ovens, 27%; manual defrost refrigerators, 44%; auto-defrost refrigerators, 60%; freezers, 64%; microwave ovens, 19%; central air conditioning, 26%; washers, 87%; dryers, 81%; dishwashers, 53%; colour televisions, 66%. Only 10% had increased their ceiling insulation in the previous year, while 39% had never done so. Almost 50% had never increased the number of storm windows. More than two-thirds (70%) had lowered thermostats during heating season, while 30% had reduced air conditioning use. About 45% said they would permit a load survey meter to be installed (over 40% were not sure).

3605

Jackson, Edgar L.
1980 Perceptions of Energy Problems and the Adoption of Conservation Practices in Edmonton and Calgary.
Canadian Geographer, 24, 2, 114-131.

Objectives: To examine: (1) perceptions of energy problems, (2) conservation practices perceived and adopted, (3) the association between perceptions of energy problems and the adoption of conservation practices, and (4) the association between socioeconomic variables and energy perceptions and behaviour

Method: A mail questionnaire was used to collect the data from residents of two Alberta cities. Nearly half (455 of 1,005) of the questionnaires were returned.

Variables: Dependent: perceived seriousness of energy crisis, awareness and adoption of conservation practices

Independent: demographics

Findings/implications: Only 12% thought that energy shortages were a serious problem in Alberta at the time. However, 24% felt shortages were serious in Canada, and 53% felt they were serious worldwide. Younger persons, women and homeowners were more apt to describe the situation as serious. Fifteen per cent were not aware of any conservation practices, and 22% had not adopted any. Practices adopted tended to involve little personal sacrifice or change in habitual behaviour; practices most commonly adopted were turning off lights (63%) and reducing house temperature (52%). Adoption of behaviour tended to increase as perceptions of seriousness increased, but only to a limited degree. Findings suggest a need for public education and information programs. As well, obstacles inhibiting the adoption of conservation practices need to be identified, and appropriate incentives for adoption developed.

3610

John Straiton & Partners Limited
1979 Office of Energy Conservation Research Study.
Prepared for the Government of Saskatchewan.

Objectives: (1) To identify knowledge and concern about the energy situation among Saskatchewan residents; (2) to identify knowledge of and attitudes towards energy conservation activities, programs and policies; and (3) to identify current energy-conserving activities

Method: Telephone interviews were conducted in June-July 1979. A total of 1,206 were completed (21% were with persons 15-17 years of age).

Variables: Dependent: energy-related attitudes, opinions and knowledge

Independent: demographics

Findings/implications: Energy was ranked fourth on a list of seven concerns facing Saskatchewan. Younger people and those living in rural areas showed higher levels of concern. The price of energy was more of a concern than availability. Less than 30% believed it was likely that Saskatchewan would experience gasoline or heating oil shortages in the next five years. Residents were positive about the value of individual efforts in conserving energy, but less positive about the likelihood of individuals making efforts to do so. Many respondents claimed to be involved in some acts to conserve energy: turning off lights, 88%; turning thermostat down, 80%; driving more slowly, 54%. Activities were motivated primarily to save money or to increase comfort (insulating home). There are strong feelings against measures such as rationing or increasing energy prices. A need exists for information about basic energy conservation activities. Some (23%) believe that technology alone will solve the energy crisis. More people believe that an adjustment to their way of life will be required; 55% think this will mean a lower standard of living, while 28% foresee higher unemployment.

4005

Katz, Reinhard

1980 Energy Conservation from a Consumer Perspective: A State of the Art Review.
Working paper, Institut Für Marketing, Westfalrsche Wilhelms-Universitat Munster, Federal Republic of Germany.

Abstract: The construct "energy conservation behaviour" has been operationalized in a variety of ways by various studies, ranging from attitudes and knowledge about energy, to behavioural intentions, self-reported behaviour and objectively measured behaviour. A number of theoretical approaches have been used to explain energy conservation behaviour. Stimulus response models have been used to examine the relationship between demographic variables and conservation. Stimulus-organism-response models have examined conservation from economic, psychological and sociological perspectives. The economic perspective has examined the effects of prices on energy use. In terms of psychology, studies have examined the impacts of motivation on consumption. As well, the role of attitudes has been scrutinized, including the relationship between attitudes and behaviour. Other literature has been devoted to the lifestyle effects of using less energy. From the sociological perspective, studies have applied the theory of adaption and diffusion to the spread of energy conservation devices. The understanding of energy conservation behaviour is a prerequisite for the implementation of policies to influence that behaviour. Marketing measures to increase conservation could be classified as: (1) product (energy standards); (2) communication: including general information (exhortations and prompting, social commendation, fear appeals) and more specific information (prepurchase, feedback); (3) financial: including taxes and utility rate structures; and (4) distribution (of energy-conserving products). Future research directions and issues are discussed.

4010

Katzev, Richard, and Wallace Bachman
1982 The Effects of Deferred Payment and Fare Manipulations on Urban Bus Ridership.
Journal of Applied Psychology, 67, 1, 83-88.

Objective: To compare the effects of various economic incentives designed to promote bus ridership and, correspondingly, reduce automobile driving

Method: Subjects were members of 152 households in Portland, Oregon. Baseline information was collected for three weeks, treatment for four weeks, and a follow-up survey was conducted for two weeks. Car mileage was monitored twice per week, and subjects were given cards to be punched each time they rode the bus. There were five treatment conditions.

Variables: Dependent: number of bus rides taken, number of miles driven

Independent: treatments: (1) control -- subjects were told they were part of a study measuring mileage and bus ridership; (2) credit only -- subjects gave bus drivers credit slips and were billed at month end by transit; (3) credit plus inverted fare -- if subjects rode the bus more than four times per week, all rides in that week were charged at half-fare; (4) credit plus differential fare: subjects were billed at half-fare for off-peak rides; (5) free tickets -- an unlimited number of credit slips were provided

Findings/implications: During baseline, bus ridership was not significantly different between groups. During treatment, control increased mean bus rides per week, .08; credit only, .12; credit plus inverted fare, .67; credit plus differential fare, .40; free tickets, .94. Only for the free tickets and credit plus inverted fare was the increase significantly above that of the control group. The effects did not last long, and in the follow-up period bus ridership returned quickly to baseline levels. There were no significant changes in miles driven. More refined techniques for measuring and collecting ridership data need to be developed. Increases in bus ridership were not associated with correponding decreases in miles driven, and therefore no energy conservation resulted. Automobile usage might be more effectively reduced by employing driver disincentives.

4015

Katzev, Richard, Laura Cooper, and Pat Fisher
1981 The Effect of Feedback and Social Reinforcement on Residential Electricity Consumption.
Journal of Environmental Systems, 10, 3, 215-227.

Objective: To explore the effect of informational feedback in reducing electrical energy consumption in all-electric apartments

Method: This study took place in an apartment complex in Portland, Oregon, during the summer of 1977. For various reasons, data could be collected for only 44 of the 106 units in the complex. The 44 units were matched into 11 quads (the 4 units had similar consumption levels during baseline) and the quads were assigned to one of four treatments. The study lasted seven weeks: baseline (two weeks), information collecting (two weeks), treatment (two weeks), and follow-up (one week).

Variables: Dependent: electricity consumption

Independent: treatment: (1) control -- meters read daily; (2) daily contingent feedback -- a feedback sheet was taped to the apartment door each day, providing information in terms of kilowatt hours and cost; (3) three-day contingent feedback plus decal -- feedback was provided every third day, along with a decal if consumption was down from the previous period; (4) three-day noncontingent feedback plus decal -- subjects were told every three days that they had decreased consumption, regardless of actual usage

Findings/implications: Although most subjects used less electricity during treatment, there were no significant changes or differences in consumption either between or within groups. It would appear that feedback alone does little to promote energy conservation. Research is needed to clarify the specific conditions under which feedback may have some effect (frequency, goal setting, etc.). The parameters governing the nature of the influence of feedback on consumption need to be determined before generalizations about the impact of any energy-conserving technique can be formulated in a more exact manner.

4020

Khristy, C.J.
1980 Some Views on Traffic Management Strategies -- With Emphasis on Parking and Energy Use.
Traffic Quarterly, 34, 10, 511-522.

Abstract: This report examines strategies aimed at reducing energy consumption, relieving traffic congestion and augmenting transit usage. The present situation related to parking in central business districts has, generally, worked toward encouraging auto commuting to the detriment of short-term parking. This has reduced transit patronage, resulting in less reliable transit service. The energy crisis has not affected work driving plans to any great degree. The auto is the most energy-intensive mode of transportation, mainly because of low (1.3 for work trips) occupancy rates. Strategies discussed include: (1) reduction of off-street parking; (2) controlling on-street parking; (3) banning free parking; (4) providing park-n-ride facilities; (5) changing the parking rate structure by increasing rates, eliminating monthly rates, and inverting the rate structure; (6) instituting a congestion pricing scheme, which would involve a licence fee for entering certain zones of the city during certain times, and providing shuttle buses within that zone.

4025

Kline, S., et al.
1978 Conservation Attitudes and Conservation Behavior.
Prepared for the Ministry of Energy, Government of Ontario.

Objectives: (1) To map the beliefs and attitudes about the energy situation held by the Metropolitan Toronto public; (2) to estimate the extent of the behaviour-attitude consistency; and (3) to examine the structure and effects of rationalizations for not undertaking conservation practices

Method: A series of in-depth interviews were first conducted to aid in the questionnaire construction. For the actual study, 523 homeowners in Toronto were contacted; interviews were completed with 60% of them.

Variables: Dependent: appliance usage, perceptions of own conservation behaviour, self-reported behaviour, perception of the energy crisis, perceptions of possible solutions to the crisis, concern about the crisis, attitudes towards government policies

Independent: participation in community, demographics

Findings/implications: The most frequently owned appliances were: washing machines (90%), televisions (90%) and cars (85%). The most common reported conservation practices were: turning off lights (90%) and turning down thermostats (75%). Most people saw themselves as better conservers than others in general. They did this in an inverse relationship to their actual conservation as based on appliance ownership. Over half felt that the way they lived would be changed greatly by the energy shortage. Most people (75%) thought that the government was not doing as much as it could to prevent a crisis. Many (70%) believed that science would provide for future energy needs. The energy issue was ranked fourth in a number of major issue facing the nation (behind inflation and unemployment, pollution and the environment, and crime and violence). Over half (53%) were against energy price increases as government policy, while 39% disapproved of rationing. Beliefs and attitudes about the crisis were only minimal predictors of actual conservation, and weak predictors of self-reported practice and intent. People may be rationalizing discrepancies between what they believe ought to happen and what they perceive themselves and others actually doing. Rationalizations include: convenience (it is too inconvenient); efficiency (it doesn't save enough money); incredulity (shortage is not serious); and reference group (other

Kline, S., et al. (cont.)

people aren't doing it). These rationalizations are related to conservation policies. Overcoming these rationalizations is essential to establishing the validity and acceptance of policies and information programs.

4030

Koeppel, K.W. Peter, and Stephen Ortmann
1980 Auto Purchasing Patterns During the Gasoline Crisis of 1979. Preliminary research report for the Planning Research Unit, New York State Department of Transportation, Albany.

Objectives: To determine whether the public's attitude towards fuel-efficient vehicles had changed as a result of the 1979 gasoline crisis. More specifically the study hoped: (1) to establish which households were more likely to take a vehicle ownership-related action, and (2) to identify the extent to which fuel economy might have played a role in the decision process leading to the ownership action.

Method: A two-stage panel survey was conducted (March and June 1979) in New York State, with roughly 12,000 usable responses.

Variables: Dependent: automobile purchase behaviour

Independent: demographic and socioeconomic characteristics

Findings/implications: The 1979 energy crisis did not change the circumstances under which people replace, add or delete cars, but it did significantly influence fuel economy as a decision criterion. The most active vehicle replacers were found to be households of working age, with medium to high income, more than one income-earning member, residing in upstate New York urban areas. Virtually all households improved fuel efficiency through the vehicle replacement decision, with an average savings of 266 gallons per year per replacement. The authors recommend that the U.S. Federal Fuel Economy Standards be continued and that fuel economy publications for used cars be made available through car dealers and public information organizations.

4035

Kohlenberg, Robert J., and Susie Anschell
1980 Conclusions and Recommendations for Electrical Energy Conservation Based on the Washington Rate Demonstrations Project. Institute of Governmental Research, University of Washington.

Objective: To explore the potential of using feedback to bring about conservation of electrical energy

Method: A number of studies/experiments were conducted during 1976-80. Included were: (1) peaking study; (2) City Light study -- tested higher rates, shorter intervals between utility bills, and a steeply inverted rate structure; (3) rate-the-same -- tested effects of a rate increase on consumption; (4) cash rebates -- rebates of up to $8 per month were provided; (5) informative billing -- involved 5,000 customers, tested effects of a more informative utility bill; (6) daily feedback -- provided for 28 days; (7) shower monitors -- devices fitted to shower heads provided feedback re energy usage; (8) energy monitor -- daily or continuous feedback provided to users by device.

Variables: Dependent: energy use

Independent: treatment

Findings/implications: Rate increases usually produce decreased consumption, but effects dissipate after a short time. Increases should perhaps be implemented in stages at six-month intervals to maximize conservation effects. General information-type approaches that urge users to reduce energy consumption do not seem to be worthwhile -- more research in this area may be required. Inclusion of extensive detailed energy-use information on utility bills does not, by itself, reliably produce a conservation effect. Feedback on energy can produce conservation effects, but it must be given more frequently than the typical bimonthly bill. The use of feedback devices could make immediate feedback cost-effective on a widespread basis.

4040

Krapfel, Robert
1980 Public Sector Marketing: The Solar Energy Experience.
In R. Bagozzi et al., eds., Marketing in the 80's: 1980 Educators' Conference Proceedings.
American Marketing Association.

Objective: To examine the Department of Energy programs aimed at stimulating consumer acceptance of solar energy, in order to determine their effectiveness and appropriateness

Method: Questionnaires were mailed to 411 solar manufacturers, distributors, consultants and architects. At the time of writing, 105 questionnaires had been returned. Respondents were asked to evaluate nine federal programs on two dimensions, effectiveness and appropriateness.

Variables: Dependent: evaluation of program

Independent: group membership

Findings/implications: No significant differences were found between groups. The professionals were less satisfied with the execution of programs than with their concept. Less-favoured programs included those training solar tradespeople, demonstration programs and consumer information programs. Those gaining most approval were programs granting tax credits to consumers and industrial investors. The federal government implemented most of the programs before any signficant consumer research was undertaken (an incorrect sequencing of activities). As well, there is some evidence that consumer tax credits are not large enough to produce appropriate payback periods.

4045

Kuhn, David J.
1979 Study of the Attitudes of Secondary School Students Toward Energy-Related Issues.
Science Education, 63, 5, 609-620.

Objective: To explore the pattern of responses of a population of high school students on an opinionnaire on energy-related matters

Method: The questionnaire was administered to 413 grade 10-12 students in a school system in the southeast United States during April 1978. The questionnaire used was the Energy Opinionnaire, a Likert-type instrument consisting of 82 items.

Variables: Dependent: various energy-related opinions

Independent: sex, self-ratings of efforts to keep informed on energy issues

Findings/implications: Males were generally more likely to be pronuclear, to feel the energy problem was political, to believe fossil fuels will run out, to have faith that other energy sources will be discovered, to feel that small cars were ugly and uncomfortable, and to believe in solar as the best way to provide an unlimited energy supply. Those rating themselves as highly informed were more likely to be pronuclear, to feel that the United States has a need for a cohesive energy policy, to agree that the government has not made an excellent attempt to conserve energy, and to be willing to use buses (if service were available). Energy education has a vital role in the future of the United States. It should provide a balanced view of complex and controversial issues.

4050

Kulash, Damian J., and Carmen Difiglio
n.d. Impact of Mandatory Fuel Economy Standards on Future Automobile Sales and Fuel Use.

Abstract: Based on explicit estimates of the costs of improving the technical efficiency of new automobiles and a behavioural model of consumer automobile choice, this paper attempts to provide a basis for projecting and evaluating the impact of mandatory fuel-economy standards on automobile sales and fuel use. The projected impact of mandatory standards is evaluated with respect to fuel consumption, sales-weighted fuel economy, automobile sales, scrappage of vehicles, fleet composition, and vehicle-kilometres of travel. It was found that increases in gasoline prices would likely reduce automotive fuel consumption -- but at the expense of creating substantial reductions in vehicle-kilometres and the number of automobiles sold. Fuel-economy standards, however, would also serve to reduce fuel consumption but would not affect automobile sales and travel. The paper goes on to suggest that existing legislation should be changed to revise both the standards and the penalty structure.

4055

Kushler, Martin G., and John C. Jeppesen
1981 Teenage Consumers and Energy Conservation.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 56-68.

Objective: To discuss the results of a large-scale, multiphase research effort which examined energy conservation attitudes and behaviour of high school youth and how they might be positively influenced

Method: Phase I tested methods for creating an "energy conservation ethic" in high school youth. Phase II investigated strategies designed to get teachers to teach energy conservation in their classes. Phase III surveyed over 40,000 students in 161 high schools in eight states (Alabama, Delaware, Missouri, Nebraska, North Carolina, South Dakota, Wisconsin and Washington).

Variables: Dependent: energy conservation behaviour, energy conservation attitudes

Independent: grade, sex, demographics, exposure to energy conservation instruction

Findings/implications: Females were more positive towards energy conservation than males. Higher grade levels generally had higher scores, as did those with higher grade point averages. The students who had received energy conservation instruction had more positive attitudes and reported having performed more energy conservation behaviours. Following the Three Mile Island incident, a group of students were requisitioned: those living closer to a nuclear power plant were significantly more proconservation, prosolar, and less pronuclear after the incident. Car ownership affected attitudes: those with their own cars and those with larger cars were less positive towards conservation than were their counterparts (non-owners and owners of small cars). There may be a potential for influencing attitudes and behaviour through energy conservation instruction.

4405

LaBay, Duncan G., and Thomas C. Kinnear
1981 Consumer Adoption of Solar Energy Systems.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 115-122.

Objective: To explore the appropriateness of concepts identified in the larger body of adoption-diffusion research to a product category which entails high technology, represents a large financial commitment and has overriding lifestyle implications

Method: A mail survey of 631 Maine residents was undertaken. Three groups and questionnaires were involved: (1) adopters of solar home/water heating systems, (2) nonadopters aware of such systems, and (3) unaware nonadopters. Multivariate nominal scale analysis (MNA) was used in the analysis.

Variables: Dependent: adopter vs. nonadopter, aware vs. unaware, perceptions about solar systems

Independent: demographics, perceptions about solar systems

Findings/implications: Adopters are younger, more highly educated, higher in income and in occupational status, and earlier in the family life cycle (vis-à-vis the general population). Adopters and aware nonadopters are very similar. Trial of solar energy systems cannot be evaluated in the traditional sense of adoption modelling, because of the financial commitment involved for a "trial." Economic and functional considerations are of major concern to adopters (and aware nonadopters). Generally, the attribute perception data afford greater classification ability than do demographic data.

4410

Lakshmanan, T.R., and William Anderson
1980 Residential Energy Demand in the United States.
Regional Science and Urban Economics, 10, 3, 371-386.

Objective: To estimate demand elasticities for major energy forms (oil, natural gas and electricity) in the residential sector

Method: Annual observations of energy consumption per capita by fuel type for 48 states for the years 1972-75 were used in the analysis.

Variables: Dependent: consumption

Independent: price, income, region

Findings/implications: The price of electricity, the price of gas and income are all statistically significant determinants of electricity consumption. Elasticity of the price of electricity is -0.642. Natural gas consumption is strongly determined by the price of natural gas, income and heating degree days. Own-price elasticity is -1.947. For oil, the price of natural gas, the price of electricity, income and heating degree days are significant determinants. It appears that the more rural states have higher per capita electricity consumption. The long-run elasticities of electricity demand are -0.718 for marginal price of electricity, 0.72 for income and 0.5 for gas price; corresponding estimates for natural gas demand are, respectively, -2.118, 2.003 and 0.78.

4415

Lang, Reg
1980 Energy Conservation Through Land Use Planning in Canada: Overview and Outlook.
Presented at Symposium on Energy Conservation Through Land Use Planning, Montreal.

Abstract: The two energy end-uses that have great potential for energy conservation and are capable of being most directly influenced by planners are transportation and space heating. In the future, settlement will be compact; people will live close to their places of work, shopping and recreation; multiunit low-rise structures will dominate newer residential areas; structures will be sited and landscaped with sun and wind in mind; and all buildings will be weatherproofed. Population densities will make transit more feasible, and it will be convenient, efficient and heavily used. The potential contribution of planners to energy conservation can be summarized by three basic goals: (1) conserving energy by promoting a more energy-efficient pattern of urban settlement at regional, municipality-wide and neighbourhood scales; (2) achieving more energy-efficient urban development and redevelopment through sound site planning, landscaping and building practices; and (3) increasing the future energy self-reliance of the community within its regional context.

4420

Lang, Reg, and Audrey Armour
1980 Energy Conservation and the Municipal Planner: Summary of Survey of Municipal Planners in Canada.
Faculty of Environmental Studies, York University, Toronto, Ontario.

Objective: To investigate Canadian municipal planners' attitudes towards energy issues affecting their work, the extent to which they are applying available energy measures, and their perceptions of barriers to, and support needed for, such energy-oriented municipal planning

Method: Questionnaires were distributed to 88 municipal planners across Canada during December 1979. Total number returned in usable form was 66.

Variables: Concern over energy problem, positions on energy conservation, perceived potential contribution of planner re energy conservation, energy-related activities undertaken, perceived barriers to energy-oriented planning

Findings/implications: Concern is highest in the Atlantic region, and lowest in the West. Most (65%) agree that they should facilitate or promote energy conservation. Most planners (82%) believe they have a significant potential contribution to make to energy conservation. Most common energy-related activities include increasing residential densities, increasing the response capability of the planning office, coordinating land-use/transportation planning, and including energy policies in the municipal plan. Perceived barriers to energy-oriented municipal planning include lack of a clear mandate, public apathy, insufficient staff resources, and inadequate methods and techniques. Planners feel that the federal government should provide financial assistance, research and information, policy direction, and public information and education.

4425

Lazare, Peter, and William Gengler
1980 An Evaluation of the Minnesota Home Energy Audit Program. Minnesota Department of Public Service, St. Paul.

Objectives: (1) To assess consumer response to the Home Energy Audit (HEA) program; (2) to determine homeowners' accuracy in completing the HEA form; and (3) to compare HEA participants and nonparticipants

Method: The HEA (a computerized audit) was offered to 540,000 Northern States Power (NSP) customers, 94,000 of whom completed and returned the form. One thousand participants and 1,000 nonparticipants were surveyed in October 1979 (returns were 882 and 440 respectively). In St. Paul, 312 homes were audited by trained inspectors to verify the accuracy of the original homeowners' responses. A comparative analysis was done on 144 of these cases (homeowner's completion of the HEA form vs. auditor's verification). The utility bills for 64 participants and 81 control cases were examined for the period January 1976 to June 1980.

Variables: Dependent: energy-conserving actions taken, reasons for taking actions, intentions to conserve, demographics, auditor's evaluation of home, actual fuel consumption

Independent: participant vs. nonparticipant

Findings/implications: Ninety-one per cent of the participants and 83% of the nonparticipants had conserved during the previous year. Their major reasons for conserving were rising energy costs (70%) and concern re decreasing energy supplies (15%). The HEA was not a significant motivation. Over 70% intended to take some conserving actions during the next year. Eighty-six per cent of the participants would have taken the HEA-induced actions regardless. Of the nonparticipants, 78% said they had not received the form and 13% said they had already conserved. The participants were better educated, younger and had larger families (differences were small). Participants and nonparticipants were, all in all, very similar and representative of all NSP customers. Overall, one-third of the responses on the original audit form were incorrect (as verified by inspectors). Mistakes were due in part to confusing, ambiguous questions. Participants were 90% correct on questions regarding home characteristics, but only about 50% correct on quantitative questions (amount of insulation, estimation of heating bills). Participants had a lower mean monthly gas consumption in 40 of 54 months analyzed (vs. control).

Lazare, Peter, and William Gengler (cont.)

Mean electricity consumption was lower in 35 of 54 months. Over the 54 months, participant consumption fell in relation to control; however, the trend preceded participation in HEA. There is no evidence that HEA had an impact on fuel consumption. It is difficult to calculate a cost/benefit ratio for HEA without knowing what impetus HEA actually gave to conservation activites.

4430

Lazare, Peter, William Gengler, and Helena Loucks
1980 An Evaluation of the Northern States Power Company Attic Re-insulation Program.
Minnesota Department of Public Service, St. Paul.

Objectives: (1) To describe NSP's Attic Re-insulation Program; (2) to assess consumer opinion about the Program; (3) to determine the Program's conservation impact; and (4) to develop a model conservation financing program

Method: The Program, begun in 1974, offered financing for attic reinsulation and arranged for contractors to contact interested customers. In January 1980, a survey was conducted of approximately 1,200 Program participants and 1,200 nonparticipants. Returns were 841 and 732 respectively. Loan recipients (450) were surveyed as well, with 345 returning completed questionnaires. Other groups, including contractors (27), banks (5), consumer groups (5) and utilities (5), were also surveyed.

Variables: Dependent: insulation in attic, assessment of contractors, opinion of NSP's conservation efforts, income, education, intentions to reinsulate, assessment of the Program

Independent: participant vs. nonparticipant, loan recipient

Findings/implications: About 10% of NSP customers requested that NSP have an insulation contractor contact them. Of those, 27% did not receive an evaluation and 50% were reinsulated. Average amount of attic insulation for nonparticipants was 7.3 inches; participants, 9.6 inches; reinsulated: before, 4.3 inches, after 11.1 inches. Eighty-five per cent found the contractors somewhat or very informative, and 83% said the quality of work was good/excellent. Participants had significantly higher average incomes than other NSP customers. Those who reinsulated had even higher incomes, and those who received financing had yet higher incomes. There would appear to be a large potential demand for the Program in the future, given that there are a large number of nonparticipants with low attic insulation levels. Forty-nine per cent of the loan recipients would have reinsulated without the loan. There were some complaints that the loan terms were too stringent (loan maximum too low). It is estimated that the annual savings from the Program are somewhere between 22 and 72 billion BTUs. (Estimates are based on the number of people who were not sure or would not have reinsu-

Lazare, Peter, William Gengler, and Helena Loucks

lated without the Program, and before and after attic insulation levels of participants.) Results from the surveys of the other groups suggest that there may have been some problems with the quality of the work done, and that loan terms should be made more liberal. A model program is outlined, taking into account these recommendations.

4435

Leonard-Barton, Dorothy

1981 The Diffusion of Active Residential Solar Energy Equipment in California.
In A. Shama, ed., The Diffusion of Solar Energy Innovation. New York: Praeger Publishers, in press.

Objective: To summarize the state of the diffusion of solar energy equipment in California

Method: The analysis draws on information gathered in five studies of solar adopters, nonadopters, homeowners and individuals involved in the solar industry. Two studies are relied on more heavily: a survey of 111 adopters and 104 nonadopters around San Francisco, and a statewide survey of 812 homeowners.

Variables: Dependent: adopter/nonadopter

Independent: demographics, level of awareness about solar, information sources, belief in energy crisis, attitudes about solar equipment, factors in decision to adopt, likelihood of adopting solar

Findings/implications: Large numbers of homeowners are relatively unfamiliar with home uses for solar. People are most apt to learn about solar from friends and sellers of solar equipment. Solar adopters are less likely to believe that the energy crisis is a hoax. Financial advantages (lower energy bills) are the most important factors in the decision to adopt, while the initial cost of the equipment is the major reason for not adopting. Adopters are more optimistic about the number of years it would take solar equipment to pay for itself in utility bill savings. Half the adopters said the state tax credit was not an important element in their purchase decision (though 86% took the credit). Less than 10% of the homeowners said that it was very likely/likely they would adopt a particular type of solar equipment. The variables which best predict the intention to purchase include the number of solar owners known, score on an index of voluntary simplicity behaviours, belief about payback periods, and attitudes about the feasibility of solar for the respondent personally. Most adopters (95%) expressed satisfaction with their equipment and would repeat the investment. Some industry officials fear that government intervention in solar will lead to very strict standardization. Four conclusions are reached: (1) solar is in its infancy; (2) the residential solar equipment market is not as homogeneous as some would assume; (3) word-of-mouth advertising is the major means of spreading the diffusion of residential solar; and (4) the best roles for government are to provide financial incentives and to invest in research on solar technology.

4440

Leonard-Barton, Dorothy

1981 Diffusion of Energy Conservation and Technologies. In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 97-107.

Objective: To present data from three studies which deal with the diffusion of energy-conserving innovations

Method: Data are drawn from three California studies: Palo Alto (personal interviews, N = 215); Pilot Solar (personal interviews, N = 215); Statewide (personal interviews, N = 812).

Variables: Palo Alto: attitudes; self-reported behaviour; actual gas, water and electricity usage; adoption of energy-conserving practices and equipment;
Pilot Solar: adoption vs. nonadoption of solar equipment;
Statewide: perceptions and awareness re solar equipment, communication channels utilized, levels of interest and intentions to purchase

Findings/implications: The Palo Alto study established that information about energy conservation can be transmitted through a neighbourhood network even when energy-saving innovations are not visible and that conservers are regarded as credible sources of information by others in their network. In the Solar Pilot study, adopters and nonadopters both considered interpersonal sources of information to be most useful when considering the purchase of solar equipment. The single strongest predictor of intention to purchase solar equipment is the number of owners a potential adopter knows (from the Statewide study). Current owners are highly satisfied with their equipment. A major predictor of intention to buy is the number of years respondents believe it would take solar equipment to pay for itself in utility bill savings. Interpersonal contacts are probably being underutilized in most present efforts to diffuse solar technology.

4445

Leonard-Barton, Dorothy

1980 The Potential Market for Solar Equipment Among California Homeowners.
Final Report to the California Energy Commission, Sacramento, California.

Objective: To discover the extent and nature of the potential market for solar equipment in California, in terms of residential attitudes, interest, and the role of interpersonal and informational influences

Method: In-home personal interviews were conducted with 812 California homeowners from a scientifically selected statewide sampling. A probability sample composed of 200 major sampling point clusters was used for the survey. Frequent comparisons are made with a pilot study conducted one year previously.

Variables: Dependent: awareness of solar equipment, attitudes towards solar, adoption of or intention to purchase solar equipment, attitudes towards the energy crisis

Independent: socioeconomic/demographic variables: age, sex, race, stage in family life cycle, income, education, occupation, location; house characteristics

Findings/implications: While many Californians are aware in general terms of solar equipment, they have had very little experience with it and are quite unfamiliar about how it works and how much it costs. Those more knowledgeable about solar equipment are likely to be younger, more highly educated professionals. The more owners of solar facilities one knows, the more aware of and the more positive one is towards solar. While a majority feel that solar technology still has its problems, nearly two-thirds feel that solar is a "desirable energy source for household use." Major advantages of solar are seen to be lower energy costs and its contribution to reducing the energy crisis; the major barrier to adoption is perceived expense. There is no relationship between estimates of payback and attitudes about solar, but "voluntary simplicity" is a good predictor of behavioural intent among homeowners in general. Most respondents are not likely to purchase any solar equipment in the near future, but cost considerations may change their minds. Awareness of a tax credit is somewhat related to purchase intentions as is stage of family life cycle. Government incentive programs are favoured over mandated ones to encourage future adoption, but it is clear that the influence of present solar owners as opinion leaders is more valuable.

4450

Levine, Mark, et al.
1981 Economic Analysis of Consumer Energy Decisions.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 141-146.

Abstract: This paper describes a study of consumer decision making in the purchase of energy-consuming and energy-conserving equipment. Specific research efforts undertaken by a number of U.S. organizations include investigation into implied discount rates for energy conservation in new buildings; implied discount rates for energy efficiency in appliances, furnaces and air conditioners; segmentation of appliance sales and efficiency data by markets; implied discount rates by market segment; assessment of market barriers to energy conservation; satisficing behaviour model of consumer purchase decisions; effect of implicit discount rates on residential energy demand forecasts. Some results: consumers fail to fully consider the benefits of energy-savings when investing in energy-saving goods; more than 25% of energy use is controlled by agents whose decision-making process is completely insensitive to the market. The use of high implicit discount rates by consumers points out the need for energy-efficiency standards. The research in this area is far from being completed.

4455

Liew, Chong K.
1978 Measuring the Substitutability of Residential Energy Consumption.
Proceedings of the American Statistical Association.

Objective: To measure the elasticity of consumption and degree of substitution caused by an energy price increase for electricity, natural gas and fuel oil in the residential sector

Method: A model is formulated to take the substitution effect into account. A translog expenditure function is derived from the translog indirect utility function to exclude the effects of income in the elasticities. Compensated own and cross-price elasticities are also obtained, and the model is discussed in both the homogeneous and general case.

Variables: Dependent: per capita consumption of electricity (kilowatt hours), natural gas (BTUs) and fuel oil (gallons); stock of electrical appliances; rates of appliance usage; appliance depreciation rates

Independent: socioeconomic factors, income, weather conditions, energy prices

Findings/implications: Compensated price elasticities (excluding income) are found to be: electricity, -.2371; natural gas, -.4303; and fuel oil, -.8103; implying that fuel oil demand is most sensitive to price, and electricity demand the least. For policy purposes, a price increase to reduce consumption would be least effective for electricity, and most promising for fuel oil.

While income elasticities showed little difference, another revealing result was found in the estimation of cross-substitution elasticities (measuring the impact of price change for one type of energy form on consumption of other types). The results show that while there will be substitution effects for all three, a price change for electricity produces the strongest effect. Neither fuel oil nor natural gas creates any similarly strong reactions. The most logical policy for energy conservation would therefore be a price increase for fuel oil or natural gas, since the goal is to minimize as much as possible the effects of substitution. A price increase for electricity is found not to be feasible for two reasons: there will be too little reduction in electricity consumption and too much switching to alternative uses.

4460

Light, Stephen S., Patrick West, and William Hammitt
1978 Gasoline Prices, Outdoor Recreation, and the American Pursuit of Status.
Prepared for the Heritage Conservation and Recreation Service.

Objective: To determine the extent to which change in recreation behaviour due to rising gasoline prices is explained by the interaction of economic constraints on consumption and the status lifestyle dynamics of outdoor recreation participation

Method: Data were obtained from the 1977 Heritage Conservation and Recreation Service nationwide household survey, which contained a telephone sample of 4,000 respondents.

Variables: Dependent: behavioural responses (in terms of trips taken for outdoor recreation activities, and use of public transit) to increases in gasoline prices; intentions if the price of gasoline doubled

Independent: education, income

Findings/implications: Those with high incomes and high education were least likely to have taken fewer trips (31%) or shorter trips (29%). Those with low incomes and low education were most likely to have done so (58% and 53%). A similar pattern was evident for intentions if gasoline prices doubled. Interestingly, status (education) seemed to play an important role, as those with higher education were less likely to have changed behaviour than others with less education in the same income group. Park-going may become the domain of the upper middle class, and if so government should consider discontinuing subsidizing such programs. Future park development should emphasize development of park systems near cities. Fostering public transit for recreation should be considered as a policy option.

4465

Lundstrom, Erik
1980 Energy Consumption in Single-Family Houses: Influence of the Occupants.
The Royal Institute of Technology, Department of Building Economics and Organization, Stockholm.

Objective: To uncover the reasons for the wide variance in total energy consumption of different electrically heated single-family houses of identical design and construction

Method: Electricity consumption in 64 houses was compared for two time periods, May 1971 to April 1972, and December 1976 to December 1977. Forty-three of the houses had the same occupants in both periods; 21 did not. Electricity consumption for 78 electrically heated homes was monitored, and occupants were profiled by demographic data. Regression analysis was used to measure the significance of the independent variables.

Variables: Dependent: electricity consumption

Independent: family size and composition, income (total and disposable), water consumption, outside temperature

Findings/implications: The correlation of consumption for the two periods for the 43 houses which had not had a change of occupants was .77. The correlation for the 21 houses in which a change had occurred was .005. This would seem to suggest that variations in energy consumption between houses might be related to the occupants themselves. Only between 5% and 15% of the variation in consumption could be explained by the size of the family and the number of children (the income variables were not significant). For the houses occupied by the same family over a period of time, there was a linear relationship between electricity consumption and outside temperature. There was a significant relationship between water consumption and electricity consumption.

4470

Luyben, Paul D.
1980 Effects of Informational Prompts on Energy Conservation in College Classrooms.
Journal of Applied Behavior Analysis, 13, 4, 611-617.

Objective: To examine the effects of an information prompt on the frequency of lights left on in unscheduled college classrooms

Method: From observations conducted in five academic buildings, 55 target observation periods (periods which immediately followed a scheduled class) were identified and divided randomly between Group A and Group B. The experiment consisted of three stages. (1) During baseline the degree to which lights were turned off before any prompting or reinforcement was noted. (2) Letters were then written to the target professors in both groups asking them to turn out lights in specific classrooms after specific classes. (3) Six weeks later, posters with the same message (turn out lights at specific time) were put up in 27 of the rooms (Group A only), and reminder letters were sent to those professors. A short postexperimental questionnaire was distributed to the 55 professors; 24 of the questionnaires were returned.

Variables: Dependent: percentage of times lights were turned out

Independent: treatment

Findings/implications: During baseline, lights were turned out 67% of the time for Group A, and 70% for Group B. After the letters were distributed, percentages increased to 80% (a significant change) and 76% (not significant) respectively. In the poster phase, the percentage in the 10 worst classrooms in Group A (lowest response rates) went from 32% in baseline to 62% after the letter prompt. The letter-poster prompting increased the positive response in the entire Group A to 84% after being introduced. Through the use of reinforcers, changes in low-energy behaviour should be pursued as they may lessen resistance to needed changes in more high-energy behaviours (buying large cars, individual family housing, etc.). Such programs can save significant amounts of energy if undertaken on a frequent, systematic basis and, more importantly, may contribute to solving other more deep-rooted energy problems.

4805

Margolin, Joseph B., and Mark Stahr
1978 Incentives and Disincentives of Ride Sharing. Transportation Research Record No. 673, Transportation Research Board, National Academy of Sciences, Washington, D.C., pp. 7-15.

Objectives: (1) To examine carpooling from a behavioural standpoint; (2) to analyze the positive and negative effects of social, psychological and economic factors on carpooling; and (3) to develop strategies to promote carpools based on traveller needs and attitudes

Method: A sequential in-depth study incorporating the effects of specific and different behavioural incentives and disincentives was carried out in the Washington, D.C., metropolitan area. Phase 1, listening to the consumer's attitudes and preferences, provided a hypothesis-generating phase upon which a survey questionnaire was built. Phase 2 consisted of traveller attitudes being quantified from a survey of 516 people in a stratified sampling process. Data were analyzed by multivariate analysis of variance. Phase 3 used the quantified results to formulate program strategies that were eventually pretested on commuters.

Variables: Dependent: attitudes towards incentives/disincentives of carpooling, travel behaviour, intentions to change behaviour, awareness of carpool programs

Independent: commuting mode, occupation, age, sex, income, commuting distance, trip time, household characteristics

Findings/implications: Typical carpoolers were older males who travelled a greater distance than solo drivers to a job with regular work hours. A surprising result was that carpoolers and solo drivers generally showed the same ratio of licensed drivers to cars in the household and availability of alternative commuting methods. Less than a third of each type of commuter reported being aware of a carpool campaign in the past. In terms of attitudinal factors affecting mode choice, cost was not considered the most influential factor. Only a fairly small percentage felt that the drawbacks of carpooling (time, schedule adherence, restricted mobility) were better compensated for by cost savings. It turned out that the most important aspect of carpool programs was interpersonal and social factors, towards which carpoolers reacted more positively than did solo drivers. For example, most people would rather know something about fellow riders before committing themselves to a carpool. Regarding time, the largest obstacle for solo drivers is

Margolin, Joseph B., and Mark Stahr (cont.)

the belief that carpools make them late. Lanes restricted to carpools was an idea strongly approved by solo drivers, while only very stringent financial penalties for solo parking seemed to have a dissuading effect. Opinions towards these latter two issues were reinforced by the results of the pretest. Finally, several recommendations are made that point to the need for a well-planned, high-priority effort to integrate these findings into policy options.

4810

Mark, Bennett, Peter H.P. Ho, and C.S. Papacostas
n.d. Express Bus Use in Honolulu: A Case Study.

Objective: To monitor the use of a peak-period bus system in Honolulu

Method: A series of on-board surveys was made to monitor the use of an express bus system in Honolulu (Hawaii Kai). Approximately 4,570 workers in the Hawaii Kai suburb were interviewed door-to-door in a previous study, the results of which led to the implementation of the express bus system. The results of the on-board survey were compared with the predictions of the earlier door-to-door survey. The on-board survey was conducted between October 25, 1973 and May 2, 1974.

Variables: Dependent: use of the express bus service, reasons for use or nonuse

Independent: socioeconomic variables, previous and present travel behaviour patterns

Findings/implications: A substantial majority of the express bus users were white-collar workers and students. General ridership profiles remained constant over the span of the study. Increases in patronage occurred over the survey period; these increases were attributed in great part to the energy shortages experienced in Honolulu in early 1974.

4815

McClelland, Lou

1980 Deciding If and How to Allocate Energy Costs to Residents of Master-Metered Buildings.
Operating Techniques Bulletin, Journal of Property Management, September, 329-336.

Abstract: A major problem in master-metered buildings is that property owners and managers are paying for rapidly spiralling energy costs out of rents that are not rising as quickly. While one possible answer is to improve the energy efficiency of this type of building, the focus of this article is on a second approach -- cost allocation, or dividing costs among residents based on their respective metered energy use or according to a mathematical formula. Several advantages are cited in using an individually metered approach. (1) Increases in energy costs would be paid by residents automatically without a rent increase. (2) Rent increases will be smaller and less frequent. (3) It can reduce the volatile effect of energy costs on management's monthly cash flow. (4) It will promote conservation by residents. (5) It is fair and equitable. The most common method of cost allocation is conversion to individual electric or gas meters or submeters. And several types of monitors are available to measure what the individual meters cannot, that is, the costs of central heating, cooling and hot water use.

The mathematical formula alternative can be accomplished through the Residential Utility Billing System (RUBS), which divides energy costs among residents by the square footage of each apartment. While RUBS is inherently more flexible than the other metering methods, two major disadvantages are lower energy savings and inequity, since apartments of the same size receive the same energy bill no matter how much energy is actually consumed. Factors which also must be considered when choosing a cost allocation method include structural, legal, technical and economic constraints. Of special importance is the calculation of the payback period for each option, which in turn is a function of a number of financial and behavioural factors. Also relevant in the cost allocation choice will be future changes in costs and rates, residential perceptions and the sales value of the property.

4820

McClelland, Lou, et al.
1980 Evaluating Employer Programs Encouraging Use of Alternate Transportation Modes: Two Studies.
Institute of Behavioral Science, University of Colorado.

Objective: To briefly report the methods and results of two studies evaluating the alternate transportation programs of Denver firms

Method: Questionnaires were administered to all employees of several firms: Study A: 9 firms (250 employees or more); Study B: 27 firms (100 to 1,000 employees). Response rates varied from 26% to 100%, with rates above 50% for 28 firms. Employees were surveyed again one year later.

Variables: Dependent: percentage of employees using alternate transportation modes; percentage of year 1 drivers using alternate transportation in year 2; percentage of year 1 alternate transport users driving solo in year 2

Independent: Study A: programs designated as (a) minimal (required program elements only), (b) incentive-based (financial incentives only), and (c) publicity based (newsletters, posters, etc.); Study B: programs rated on four elements: (a) convenience incentives (carpool matching service, reserved carpool parking, bicycle parking, hours adjustable to bus schedules), (b) financial incentives (subsidies), (c) publicity, (d) general commitment (attitudes of executives, etc.); companies rated on availability of alternate transportation modes and on pressure to use them

Findings/implications: The program outcome correlations were consistently positive, but the portion of variance in alternate transportation use explained by variance in employer programs is 15% at most. Publicity showed a weaker association with outcome measures than did the other three elements. The program was not as effective in deterring users from returning to solo driving as it was in persuading them to try alternate transportation initially. The two environmental factors have as much impact as do the four program components. Commitment made by a company to alternate transportation use is probably as important as the methods selected to encourage it. The evaluation of alternative transporation programs is hampered by four factors: (1) specific program elements vary; (2) measurement of success is not as straightforward as it might seem; (3) environmental variables must be controlled; and (4) official data are unreliable.

4825

McClelland, Lou, and Stuart Cook
1980 Energy Conservation in University Buildings: Encouraging and Evaluating Reductions in Occupants' Electricity Use. Evaluation Review, 4, 1, 119-133.

Objective: To contrast the effectiveness of two methods of encouraging conservation in matched pairs of buildings and dormitories

Method: The study involved eight office-classroom buildings and six dormitories at the University of Colorado. The program began in February 1977. Two methods, "management," emphasizing organizational efficiency and the use of existing hierarchical lines of communication, and "user participation," delegating responsibility for the development and implementation of plans to small groups of occupants, were utilized. The actual program included posters, notices, memos and feedback reports on the buildings' consumption. Waste data were gathered through observation. Consumption was monitored for 14 baseline and 10 program weeks.

Variables: Dependent: electricity consumption, waste (unnecessary consumption)

Independent: treatment

Findings/implications: The consumption was corrected for weather effects. Consumption was significantly below expected levels for all buildings except one, where new air conditioning equipment was installed near the beginning of the program. The reduction was significantly more than that of control for all buildings but one. Neither method emerged as being consistently superior. Total savings amounted to approximately $3,500. Waste (basically, lights on in an unoccupied room) dropped during the program, most often for halls and classrooms. A number of methodological problems beset program evaluation, including prediction problems, interpretation difficulties and initial waste levels.

4830

McClelland, Lou, and Stuart Cook
1980 Promoting Energy Conservation in Master-Metered Apartments Through Group Financial Incentives.
Journal of Applied Social Psychology, January-February, 20-31.

Objective: To test the effect of "contests" offering financial prizes on energy consumption in a master-metered apartment

Method: The experiment was conducted during 1976-77 at the University of Colorado. One complex (272 units) served as control. The experimental units (228 in all) were in another complex, which was divided into four subgroups. A series of six contests were held, the "winning" subgroup being the one whose 1977 consumption was the lowest percentage of its 1976 consumption. Prizes were $80/first, $50/second. Groups were provided with an "Energy Saver's Guide," a 15-page how-to booklet written specifically for the complex. Feedback on consumption was provided weekly. Participants (37%) completed a questionnaire at the end of the experiment.

Variables: Dependent: natural gas consumption, knowledge of results

Independent: treatment/control, actions taken

Findings/implications: Savings in the first contest period were statistically significant for all four subgroups; for the last period none were. For the complex as a whole, energy savings were achieved on 68 of 84 days (significant). About 50% reported taking one or more energy conservation action. Only 28% could correctly report their group's winnings. Over the 12 weeks, energy savings were 6.6%, for a total dollar saving of $488 (vs. $780 distributed as prizes). The salience of the incentives and the degree of group interaction (and peer pressure for conservation) may influence the effectiveness of programs such as this one. Problems affecting this type of experiment concern the monetary costs of the programs in relation to their savings and the difficulties of obtaining accurate estimates of energy savings on which to base rebates or prizes. Despite these problems, group financial incentives do hold potential as a tool for encouraging conservation by residents of master-metered buildings.

4835

McClelland, Lou, and Stuart Cook
1980 Policy Implications of a Successful Energy Conservation Program in University Buildings and Dormitories.
Institute of Behavioral Science, University of Colorado.

Abstract: Methods and results of conservation programs at the University of Colorado are discussed briefly. Five broad implications are suggested for the design of energy conservation programs in institutional settings. (1) Focus and sanction: official sanction by university officials seems to be important. The authorities must be clearly and unequivocally committed to conservation, and the program should be fairly broad in focus. (2) Definitions of opportunities: building users should be asked to identify conservation opportunities. (3) New information: novel information appears to be more effective in promoting conservation than standard information (already known). Building users should thus be surveyed as to their conservation knowledge before programs are implemented. (4) Assignment of responsibility: programs should make explicit attempts to allot responsibility for particular areas or equipment to specific individuals. (5) Program renewal: programs should be short (four to eight weeks) and renewed annually.

4840

McClelland, Lou, and Rachelle J. Canter
1979 Psychological Research on Energy Conservation: Context, Approaches, Methods.
In A. Baum and E. Singer, eds., Advances in Environmental Psychology, Volume III: Energy Conservation: Psychological Perspectives. Hillsdale, N.J.: L. Erlbaum Associates.

Abstract: Elements of the psychological context of energy use include energy-consuming behaviour, individual benefits and monetary costs (associated), social costs, and balance modifiers (actions which change the balance between energy use and its benefits). There are four approaches to encouraging energy conservation: (1) changing attitudes towards energy use, (2) changing the energy-benefits balance, (3) changing the monetary costs of energy use and associated actions, and (4) explicating the incentive structure (the underlying premise is that energy-saving opportunities are not taken because an individual's knowledge and understanding of the incentive structure is inaccurate). This last approach can involve: (a) how-to-save energy information; (b) explaining the current energy-benefits balance; (c) cost information; (d) feedback; (e) explicating long-term social costs; and (f) explaining balance-modifying acts. Obstacles to these include believability and acceptability of recommended actions, dependence on existing motives, and commanding the attention and involvement of the audience so that attitude change is translated into behavioural change. There are four common research strategies: (1) true experiments; (2) true experiments with volunteers; (3) quasi experiments; (4) designs with self controls, statistical controls or no controls. Three common problems include measurement of the dependent variable (energy use), generalization of results, and practical limitations (e.g., participant availability). Despite these challenges, research is worthwhile.

4845

McClelland, Lou, and Stuart Cook
1979 Energy Conservation Effects of Continuous In-Home Feedback in All-Electric Homes.
Journal of Environmental Systems, 9, 2, 169-173.

Objective: To investigate the effects of daily energy consumption feedback on the use of electricity

Method: Consumption from 101 all-electric homes in a development in North Carolina was monitored from September 1976 to July 1977. Twenty-five of the homes were equipped with the "Fitch energy monitor," a feedback device which provides a cents per hour figure to residents (on a continuous display basis).

Variables: Dependent: electricity consumption

Independent: presence of monitor

Findings/implications: Confounding variables (house size, number of occupants) were removed statistically. Monitors were associated with lower consumption in all 11 months. The differences averaged about 12% and tended to be larger in low-consumption months. That would suggest that conservation actions taken by "monitor" households primarily affected energy uses other than cooling and heating. The monitors would have a payback period of about 1.9 years (at 1978 prices).

4850

McDougall, Gordon H.G., John D. Claxton, and J.R. Brent Ritchie
1981 Consumer Behavior and Energy Consumption: Some Empirical Observations.
Paper presented to the European Academy for Advanced Research in Marketing, Copenhagen, Denmark, March 25-27.

Objectives: To assess the extent to which in-home energy and gasoline consumption can be explained by four classes of variables: (1) climatic variables, (2) dwelling/appliance/vehicle descriptors, (3) family demographic characteristics, and (4) attitudes of male and female household heads

Method: A questionnaire was mailed to 3,000 Canadian households and data were obtained from 2,366 for a response rate of 79%. Actual in-home energy-use data were obtained for 1,587 households.

Variables: Dependent: (1) in-home energy use expressed in BTUs, (2) automobile gasoline use expressed in gallons

Independent: as noted above, the four independent variables include: (1) climate, (2) dwelling/appliance/vehicle descriptors, (3) demographics, (4) attitudes

Findings/implications: A great deal of the energy consumed by Canadian families (either in-home or in automobile use) is dependent upon structural or demographic characteristics. No attitudinal variables explained any variance in consumption, either in-home or in automobile use. It was found that nearly 50% of the variance in in-home energy consumption could be explained by degree days, family income, family size, the number of rooms in the house, the existence of a fireplace, the mean thermostat setting, the existence of electric space heating and whether the structure was a multiple-family dwelling. Neither climate nor attitudinal variables influenced automobile gasoline consumption; four automobile variables explained nearly 40% of the variance.

It appears from this study that programs which concentrate solely on changing attitudes are likely to have low conservation payoffs. It further appears that top priority should be given to programs aimed at improving the energy efficiency of the housing stock.

4855

McDougall, Gordon H.G., and Gerald Keller
1981 Energy: Canadians' Attitudes and Reactions (1975-1980). Prepared for Consumer and Corporate Affairs Canada.

Objective: To examine Canadians' attitudes and self-reported behaviour concerning energy from 1975 to 1980

Method: Telephone interviews were conducted nationwide from 1975 to 1980, with sample sizes of 1,821, 1,840, 1,815, 1,808, 1,654 and 1,637 respectively.

Variables: Dependent: level of concern with respect to energy, energy-conserving behaviour, attitudes re government involvement in the situation and re possible solutions to the energy crisis

Independent: demographics

Findings/implications: Concern about the energy crisis increased significantly in 1979 and again in 1980. More concern was expressed over rising energy prices (82% said it was somewhat/very serious) than over the possibility of experiencing shortages (66%). People were most concerned about shortages of heating oil and gasoline. There was a gradual increase in reported behaviour from 1975 to 1980: turning off lights (from 74% to 86%); use less hot water (from 35% to 47%); turning down thermostat (from 65% to 86%); driving less (from 44% to 57%). Canadians generally preferred advertising/information policies and financial incentives (involving no direct cost and no sacrifice), as opposed to rationing and price increases. From 1979 to 1980, there was an increase in the perceived need to conserve, and more willingness to support rationing and price increases. All in all, the primary motive to conserve appears to be the impact of rising prices on the standard of living. Canadians are not willing to make substantial sacrifices which would affect their current lifestyles. Since the real fuel cost per mile has declined since 1971, Canadians are not receiving the message that gasoline is scarce. Conservation programs will have only a marginal impact as long as Canada maintains a cheap energy policy.

4860

McDougall, Gordon H.G., and Hugh Munro
1980 Consumer Behavior and Energy: Some Methodological Issues. Research Paper Series, School of Business and Economics, Wilfrid Laurier University, Waterloo, Canada.

Objectives: (1) To develop measures of attitudes, knowledge and self-reported behaviour concerning energy conservation; (2) to determine what types of relationships exist among these measures; and (3) to highlight some methodological issues surrounding the measurement of these constructs

Method: Data analyzed were collected as part of another study.

Variables: Dependent: energy conservation behaviour

Independent: energy conservation attitudes, energy conservation knowledge

An attempt was made to develop scales for each of the three constructs.

Findings/implications: Attitudes towards the energy issue comprise more than one dimension. At a minimum, two attitudes exist: importance of energy conservation and impact of individual efforts to conserve. Claimed knowledge about energy conservation was not an accurate predictor of actual knowledge. Lack of knowledge may be a prohibitor of conservation behaviour. There was no identifiable pattern of behaviour. Attitude-behaviour relationships should perhaps be examined on a domain-specific basis (e.g., home heating, automobile, electricity use) as there are a number of variables -- knowledge level, financial barriers, external factors, degree of interest -- which moderate the relationships between attitudes and behaviour within each domain.

4865

McGillivray, Robert G., and Michael A. Kemp
1974 Alternative Strategies for Reducing Gasoline Consumption by Private Automobiles.
Transportation Research, 8, pp. 349-361.

Abstract: A wide range of alternative strategy and policy options to reduce gasoline consumption in automobiles are discussed. Many different routes can be taken to achieve this ultimate goal: increased automobile efficiency, reduced availability of cars to the public, or a reduction in the time spent in the car and miles travelled. Specific strategies such as design changes, encouraging the production of economical vehicles, supply restrictions and financial incentives are compared. Potential policies can be directed at manufacturers (tax credits, production limitations and standards) or consumers (deterrents to buying inefficient cars and various taxes). Topics of rationing, restricted gas sales, restricted days for automobile use and reduced speed limits will also have direct effects on consumers. Another issue concerns the feasibility of modal shifting to buses, carpools and various paratransit services while keeping in mind the potentially adverse side effects of such action. The effect of government education programs is seen as small if they are not supplemented by fiscal or regulatory policies.

The impacts of these various strategies are considerable, with economic and behavioural factors playing a large role. Technical alternatives are suggested as well as the viability of different engine types and the role of the electric car. Alternative fuels are also analyzed but largely from a technical standpoint.

4870

McNeill, Dennis L., and R. Bruce Hutton
1981 Marketing Incentives and Energy Conservation. In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 271-279.

Objective: To report the results of the U.S. Department of Energy's (DOE) effort to motivate household energy conservation — the Low Cost/No Cost Energy Conservation Program (LC/NC)

Method: The LC/NC program was conducted in New England. It consisted of: (1) distribution by mail of LC/NC booklets; (2) mail distribution of the shower control devices; (3) an advertising campaign; and (4) public relations activities. All were designed to motivate consumers to implement 11 free or inexpensive conservation actions. A telephone survey of 1,207 New England households and 604 from New York (as control) was conducted in December 1979.

Variables: Dependent: reported behaviour re the conservation tips, attitudes towards LC/NC advertising

Independent: New England vs. New York, reader/nonreader, demographics

Findings/implications: Although New York had completed more tips prior to the program (2.77 vs. 2.00 on average), New England had completed more since (2.63 vs. 1.19). In New England 48% had installed the shower flow device, vs. 26% in New York (where they were available upon request). Significant behavioural changes were reported on four of the recommended actions. Readers of the booklet (71% of the New England sample) reported significantly more conservation actions than did nonreaders. Nonreaders had implemented more actions prior to the program. For the readers, those who were more highly educated, older and heated their homes with oil tended to do fewer of the tips. Of those who had installed the shower device, readers took more actions than nonreaders.

4875

McNeill, Dennis L., and William L. Wilkie
1979 Public Policy and Consumer Information: Impact of the New Energy Labels.
Journal of Consumer Research, 6, 1, 1-11.

Objectives: To investigate: (1) the likely impact of the new federal energy labels on consumers; and (2) the relative effect of alternative information formats

Method: One hundred and eighty females participated in the experiment, with 155 providing complete responses. Four refrigerator models were evaluated in terms of impressions, preferences and recommendations to friend. Six treatment (label) conditions, including control, were involved. Respondents also "built" their own models, making nine feature decisions (size, style, colour, insulation, defrost, ice maker, shelves, power miser, cold water dispenser).

Variables: Dependent: preferences for models, model "built"

Independent: demographics, presence of energy-use data, presence of comparative energy-use information, unit of measure (dollars vs. kilowatt hours); degree of disclosure (overall product energy use vs. energy use by each major product feature), model features

Findings/implications: The availability of new energy information did not stimulate subjects to increase the alternatives on which to seek information. About 15% of the disclosure subjects were able to rank the four models exactly in terms of energy use (none of the control group were). The highly inefficient model was rated differently by the two groups to a significant extent. The two groups did not "build" significantly different models, except that control subjects chose larger refrigerator freezers. The different format options of the label (five) did not produce significantly different results. Consumers may, in the absence of information to the contrary, assume that all models have similar energy efficiency.

4880

Milbrath, Lester W.

1980 Environmental Values and Beliefs of the General Public and Leaders in the United States, England and Germany. In Dean Mann, ed., Environmental Policy Formation: The Impact of Values, Ideology and Standards. Lexington, Mass.: Lexington Books.

Objective: To compare environmental beliefs and values across nations

Method: A mailout questionnaire was randomly distributed in England, Germany and the United States to (a) members of the general population and (b) members of the "elite" -- conservationists, union/business leaders, public officials and media "gatekeepers."

Variables: Dependent: attitudes on a number of environment-related, future direction focus questions. The one energy-related question asked respondents to indicate their preference (on a seven-point scale) for a country that obtained its energy by, on one end of the scale, conserving or, on the other end, by increasing production.

Independent: group membership

Findings/implications: In the United States, the general public showed a clear preference for conservation over increased production. Environmentalists were nearly unanimously in favour of conservation. Business leaders were spread across the continuum. Other leaders showed a preference for conservation. There seems to be public readiness for conservation and, in general, for less materialism, industrialism and domination of nature.

4885

Miller, John S., Tommy Donoho, and Marvin Orndorff
1980 The Environmental/Energy Survey, 1980.
Arkansas Science Information Exchange, University of Arkansas at Little Rock.

Objective: To examine the level and characteristics of environmental concern in Arkansas and the implications for state environmental policy in the 1980s

Method: A statewide telephone survey was conducted in January and February 1980, with 401 interviews completed.

Variables: Dependent: environment-related behaviour, preference for environment-related programs, attitudes regarding current pollution laws

Independent: occupational status, education, age, income, political party, residence

Findings/implications: Those working on farms reported fewer environment-related behaviours. Similarly, that group expressed less support for environmental programs. Younger, more highly educated persons were the opposite, reporting more behaviours and expressing more support. Almost 60% reported that they frequently turned their thermostat down in the winter or up in the summer. Over 75% reported frequently/occasionally cutting down on their driving, and 80% reported frequently turning out lights. Support for energy-related programs varied: 87% favoured enforcing the 55 mph speed limit, 10% favoured higher gasoline taxes, 28% building more nuclear power plants, 72% building more coal plants, 88% emphasizing energy conservation and 86% emphasizing solar possibilities. It is recommended that education programs, both for adults and students, be established so persons will be more aware of the issues.

4890

Milstein, Jeffrey S.
1979 The Conserver Society? Consumers' Attitudes and Behaviors Regarding Energy Conservation.
Office of Conservation and Solar Applications, U.S. Department of Energy.

Objective: To briefly summarize knowledge about consumers' attitudes and behaviours regarding energy conservation

Method: The report draws on information collected in various surveys conducted for the Department of Energy since 1973.

Variables: Attitudes towards the energy situation, awareness of the energy situation and how to save energy, conservation behaviour, energy information sources used

Findings/implications: About 50% of Americans feel that the energy crisis is a hoax perpetrated by the oil companies and/or by the OPEC countries. People become more concerned when the situation affects them directly, immediately and perceivably. The rising price of energy is the energy problem to a majority of people. People are concerned that sacrifices will not be equitably shared. Many believe in a technological solution, which removes the perceived need to take personal actions to conserve energy. There is a general lack of knowledge about the nature of the energy situation and what individuals can specifically do to conserve energy. Energy-conserving behaviours which must be maintained over time are less well practiced than are "one-time" or infrequent behaviours. The primary information sources regarding energy are television and newspapers, so these channels must be used for communication. As well, sources of information must be credible -- they must be considered expert and be perceived as having no vested economic or political interest in energy. Energy conservation must be shown as being rewarding to the consumers practicing it.

4900

Monroe, Charles B., and Peter L. Halvorson
1980 The Impact of Changes in Pricing Policy upon Transit Riders of Varying Ages in Chicago.
Professional Geographer, 32, 8, 335-342.

Objective: To determine the impact of a major fare restructuring on transit use by riders of differing ages, with particular emphasis on the young and elderly subgroups

Method: Questionnaires were distributed to all boarding passengers on 45 selected routes of the Regional Transportation Authority (RTA) for two days, one month before a new fare structure was implemented, and for two days, one month later. Over 8,000 were returned, representing a return rate of 20%-35%.

Variables: Dependent: reported changes in travel behaviour

Independent: age; mode used (Chicago bus, Chicago rail, suburban bus); rate restructuring (involved an increase on all Chicago routes, a decrease on some suburban routes, discounted fares for certain groups and changes in transfer policy)

Findings/implications: The authors, involved only in data analysis, point out inadequacies in the design and administration of the survey. For Chicago bus, Chicago rail and suburban bus, 65%, 77% and 57% reported their travel behaviour was unchanged. The young, the elderly and those riding suburban buses were more apt to report increased transit use following the price restructuring. The change in suburban use was due mainly to the transfer policy changes. On the whole, the price changes did not alter the travel behaviour of most individuals. The young and elderly reacted more positively to the changes than did the general transit population. The findings also seem to indicate a lower sensitivity among the elderly to changes in fare.

4905

Mooz, W.E.
1973 Projecting California's Electrical Energy Demand. In Energy Modeling: Art, Science, Practice (working papers for a seminar on energy modeling, January 25-26, Washington, D.C.).

Abstract: The purpose of this paper is to describe and analyze present methodologies for estimating future electrical energy demand in California, simultaneously criticizing and utilizing them to develop a new model with a fresh methodology. This new model is created to correct several difficulties with present ones: (1) the inherent bias created when utilities themselves make the projections; (2) that all utilities have their own widely varying methodological approaches; (3) that there are no formal provisions to ensure that inputs to the methodologies are consistent; (4) that the present system cannot be used for any significant analysis. There are two reasons for this: the methodologies are too diverse and even the most detailed methods are still too aggregate. A more detailed examination is needed that takes into account the influence of changing demographic and socioeconomic conditions, as well as sharp fluctuations in electricity and gas prices. The new model focuses on the residential, industrial and commercial sectors, and of special importance to the residential sector is the inclusion of inputs for 16 appliances (taking into account both annual electricity consumption and household appliance saturation levels). Long-run elasticities have also been included in the model, as well as potential substitution effects for four major appliances: ranges, water heaters, clothes dryers and space heaters. The authors believe that their methodology is a great improvement over past methods, and suggest areas where further research should be directed: a better understanding of the commercial and industrial sectors, more-accurate price elasticities and better data systems for all of these efforts.

4910

Munson, Michael J., and Rasin K. Mufti
1979 Assessing the Impact of Transportation Energy Policies on Travel Behavior: A Preliminary Approach.
Transportation Research, 13A, 407-416.

Abstract: This paper examines several policies designed to alleviate the impact of an energy shortage on travel behaviour and to forecast consumers' bahavioural responses to these strategies. Traditional models used for forecasting transportation demand are applied to the suggested policies, and future changes to the models are recommended in light of the expected consumer response. The policies are broken down into seven categories, and each is analyzed on the basis of feasibility and potential. A wide variety of areas are covered; policies increasing auto travel costs, limiting the supply of automobile fuel, and affecting geographic distribution of trip ends are found to be fairly useful, while policies that change characteristics of automobiles themselves and of nonauto transportation systems are not considered promising when the goal is to conserve fuel (by driving less, changing modes, relocating or otherwise). Policies that physically limit the use of automobiles and attempt to change travel patterns directly are questionable in their impacts.

A matrix and further analysis shows the relationships between the seven policy classes and the various categories of consumer responses. Basic transportation-demand forecasting models are differentiated to determine which ones are better able to accommodate the responses to the various policies. The most significant consumer responses are found to be travel reduction and modal shifting, the latter of which is given special emphasis. The article concludes by asking how these potential policies can be modelled in the future and recommends that improved mode choice models be integrated into the entire transportation-demand forecasting process.

4915

Murphy, Patrick E., Gene R. Laczniak, and Richard K. Robinson
1979 An Attitudinal and a Behavioral Index of Energy Conservation. In Karl Henion and Thomas Kinnear, eds., The Conserver Society. American Marketing Association.

Objectives: (1) To discover how consumers have reacted to the "tight" energy situation; and (2) to compare consumers' perceptions of the energy crisis with that of local utilities

Method: Mail surveys were distributed to 760 residents of two cities in Wisconsin in late 1977; 289 usable responses were returned.

Variables: Dependent: attitudes and behaviour (indexed and classed as low, moderate or high)

Independent: demographics

Findings/implications: The only demographic variables related to the attitudinal index were education and occupational level (positively) and social class (also positively). No significant relationships were found between behaviour and the demographic variables. The attitudes were good predictors of behaviour only for the "moderate" group. Implications for policymakers are that appeals need to be made to distinct demographic groups -- those already holding positive attitudes have to be persuaded to increase the incidence of their behaviour, while others first have to be informed so they can become committed to conservation.

5205

National Energy Study Team

1979 National Energy Conservation Campaign: Public Attitude Research.
Prepared for the Ministry for National Development, Canberra, Australia.

Objective: To provide the basis for a national energy conservation campaign

Method: The study involved surveys of customers, as well as group discussions with industry and commerce representatives.

Variables: Opinions and attitudes re energy and energy conservation

Findings/implications: Energy is not a great concern to consumers. "Energy conservation" is an antigrowth and freedom-depriving concept, and is vague, broad and unspecific. Consumers believe that if oil were actually running low it would be more expensive. They also believe that Australia has abundant resources, and that technology will solve shortage problems. They have confidence that solar power will provide many answers, and have great misconceptions about the cost and timescale involved in its development. Consumers see little need at present to begin conserving energy. Many do not think that individual efforts will help in a conservation campaign. Government is looked to for leadership. Industrial users share consumers' cynicism about the purported problem.

5210

Nebraska Public Power District
1980 Customer Appliance Saturation Survey.
Summary report of the Nebraska Public Power District (NPPD).

Objectives: To obtain more detailed information regarding the following customer characteristics which are valuable in determining future demand for electricity: (1) present stock of major electrical appliances owned by customers in the service area, (2) what actions customers have taken and will take that affect electricity consumption, and (3) demographic profile of the people in the NPPD service area

Method: A questionnaire was created, modified through pretest and then distributed to a stratified random sample of 3,485 customers. The data returned on the completed questionnaires were weighted to reflect the results extrapolated to characterize the total number of customers.

Variables: Dependent: appliance stock, saturation levels, use; heating mode choice for space heating and cooling, water heating, laundry equipment; intentions to conserve; past conservation behaviour

Independent: age of house, location, housing type, own or rent, size of house, length of time lived in house; number in family

Findings/implications: The great majority (62%) of units use natural gas for space heating, although there is considerable variation among regions. A higher proportion of newer dwellings use electric heat, as do nearly half of all apartments, but very few mobile homes are heated electrically. Comfort cooling systems exist in 76.6% of the units, the major types being window and central electric air conditioners. Newer homes are more apt to have central electric air conditioners than are older homes. Twice as many people heat water with natural gas than with electricity, again with significant interregional variations. Electric water heating is found in 93.3% of homes with electric space heating, and 83.6% of the dwellings have both a washer and dryer. About two-thirds of all ranges are electric, and 56% of refrigerators are automatic defrost. Fridges and freezers are the appliances purchased most frequently, with additional data provided on other appliance purchases. The highest saturation rate belongs to electric clothes dryers, followed by electric air conditioners and electric ranges. The housing stock is composed largely of single-family units, and a majority of people have lived in their homes ten

Nebraska Public Power District (cont.)

years or less. A significant amount of people have taken conservation measures such as insulation and retrofitting, and the increasing number who have taken multiple actions underlines the interest in conservation. This trend is expected to continue in the near future.

5215

Nelson, Jon P.
1975 The Demand for Space Heating Energy.
Review of Economics and Statistics, 57, 508-512.

Abstract: The author develops a cross-sectional model to analyze the demand for space heating energy, by state, in 1971. Using this model, the author determines that price is a significant determinant of demand for space heating energy with an elasticity of approximately -0.3. The model states that total oil, gas and coal consumed for space heating in the residential and commercial sectors is a function of the percentage of total population in the state living in urbanized areas, the mean personal income per capita in the state, the weighted average residential and commercial price of fuel, the average residential and commercial price of electricity, and the weighted average heating degree days for the state. The results indicate that price increases for space heating fuels will have a rationing effect on energy.

5220

Nemetz, Peter N., et al.
1980 Economic Incentives for Energy Conservation at the Consumer Level in Canada.
Prepared for Consumer and Corporate Affairs Canada.

Abstract: This paper reviews the existing literature with respect to Canadian price elasticities of demand for gasoline, natural gas, electricity and fuel oil at the residential consumer level and interprets them in the context of using economic incentives and disincentives to modify energy demand. Its five sections include: (1) a review of Canadian and American econometric literature on the price elasticity of demand for various fuels; (2) case studies of conservation programs in California, Oregon and Wisconsin; (3) a study of pricing issues in electricity; (4) a discussion of the transferability of selected incentive systems to the Canadian context; and (5) a draft questionnaire to test consumer reaction to various incentives. Several general highlights are noteworthy. (1) Long-run estimates of price elasticities are: gasoline, -0.40 to -0.78; natural gas, -.69 to -1.83; electricity, -0.14 to -0.81; and fuel oil, -1.49. (2) In California, standards and mandatory behaviours have been used to effect conservation, while in Oregon the emphasis has been on encouraging voluntary behaviours. In Wisconsin, utilities have been directed to explore and where feasible implement rate structures consistent with energy conservation. (3) A change in the current structure of electricity rates (probably to some form of time-of-use rates) is inevitable, as conservation is more attractive than increasing facilities. (4) A conservation measure is most likely to be successful if it demands only minimal change in lifestyle, its effects are equitably distributed, and if the government leads but does not unduly control private behaviour. Accurate pricing of resources is the single most effective conservation measure.

5225

Nemetz, Peter N.

1979 Economic Incentives for Energy Conservation at the Consumer Level -- An Overview and Preliminary Synthesis. Prepared for Consumer and Corporate Affairs Canada.

Abstract: The purpose of this report is to identify economic incentives and disincentives for the modification of energy demand at the consumer level, and to assess the effectiveness and impact of these incentive systems. Government can use four general policy mechanisms to modify energy demand: (1) information programs, (2) education programs, (3) regulations, and (4) economic incentives. An efficient and effective blend of the four is needed. Government operates under economic, social, political and environmental constraints which will influence policy. In terms of the economic incentives, the linkage between policy tools and policy goals may be weak. There is uncertainty about consumer response, as its direction and intensity may be unpredictable, and potentially perverse responses can materialize. The two main areas with the largest potential savings are transportation (automobiles) and space heating. A diverse and robust policy package is required to modify consumer energy demand, as there may be a short-term insensitivity to economic incentives. A questionnaire was distributed to federal, state and provincial governments in the United States and Canada, asking them to assess policies implemented to modify consumer energy demand. Few had been returned at the time this report was written. An examination of existing legislation in the United States and Canada reveals that the United States has progressed further in terms of incentives aimed at the reduction of residential energy consumption. Research will have to evaluate unique Canadian characteristics which will influence consumer responses to economic incentives similar to those now in place in the United States. Research will also have to identify the constraints on the implementation of legislation.

5230

Neuhoff, M.C.
1965 Should Kwhr Be Included in Rent?
Electrical World, July 12, 74-75, 127.

Abstract: The author reports on a survey of 31 large U.S. utilities in which he discovers that only 4 are utilizing master-metering of new apartment buildings. In most of the cities where there was a trend away from master-metering and from inclusion of electrical charges in the rent, the main reason was a loss of revenue for the utilities. In some areas the trend away from master-metering was spurred by landlords who had been confronted with reduced revenues due to rent inclusion. Virtually all utilities were found to oppose master-metering and rent inclusion in principle.

The paper provides an interesting, pre-Embargo description of utility and landlord attitudes towards master-metering.

5235

Neun, Hansjorg

1979 Price and Quantity Perception of Complex Goods: Taking Energy Usage as an Example.
Presented at the Fourth European Colloquium on Economic Psychology, Stockholm.

Objective: To test the hypothesis that with complex consumption articles there is a tendency to underestimate the amount of energy consumption and energy costs

Method: A total of 104 interviews were completed (59 in Gundelfingen and 45 in Augsburg and Munich). Respondents were asked to supply information on actual energy usage by completing and mailing a postcard.

Variables: Dependent: estimates of personal energy consumption, actual energy consumption

Independent: attitudes towards and interest in the energy situation, allocation of appliances, sociodemographics

Findings/implications: Seventy per cent underestimated their actual electricity consumption, but 45% correctly estimated their electricity costs. Proportions making correct estimates for heating costs, car mileage and car costs were 54.1%, 57.7% and 29.2% respectively. These data tend to support the hypothesis (see Objective, above). Estimation errors appear to be greater when costs cannot be compared with a direct payment (e.g., depreciation for auto). Further research is required into the effectiveness of the price mechanism as a means of controlling energy consumption.

5602

Olsen, Marion E., and Bernward Joerges
1981 The Process of Promoting Consumer Energy Conservation: An International Perspective.
Discussion paper from the International Institute for Environment and Society.

Abstract: This paper develops a conceptual model of the process of reducing the amount of nonrenewable energy consumed by households and individuals through a series of stages as follows: (1) translating the basic goal of promoting consumer energy conservation into a number of specific objectives; (2) designing strategies for obtaining those objectives by identifying relevant features of the technical, economic, legal, sociocultural and personal contexts of energy use that must be altered, and selecting various implementation instruments with which to produce those changes; (3) conducting comprehensive community-based conservation programs that provide all the services needed by consumers to take conservation actions; (4) changing relevant structural contexts of energy use in desired ways and mobilizing individuals to practice conservation by increasing their conservation awareness, motivation, knowledge, capabilities and confirmation; (5) taking energy-conserving actions in the areas of home heating and cooling, household appliances, personal travel and consumer purchasing; and (6) evaluating the effects of these conservation actions in terms of energy savings, financial costs, environmental impacts, consumer risks and societal impacts.

Five fundamental ideas emphasized in this analysis are that, to be successful, the process of promoting consumer energy conservation must: (1) incorporate extensive citizen involvement at all stages; (2) utilize a variety of complementary implementation instruments; (3) produce both macro (structural) and micro (personal) changes; (4) be conducted at the level of the local community/municipality; and (5) be thoroughly evaluated. To the extent that consumers in all industrial countries reduce their consumption of nonrenewable energy, several desirable outcomes may be obtained. (1) Less energy will be wasted. (2) The world energy problem will be eased. (3) The natural environment will be protected. (4) Consumers will gain greater control over their economic affairs. (5) The overall quality of human life may be enhanced.

5605

Ontario Ministry of Energy

1977 A Study of the Relative Merits of Bulk and Individual Electrical Metering for Apartment Buildings in Ontario. Prepared by a committee representing Ontario Hydro, the Ontario Municipal Electric Association, and the Association of Municipal Electric Utilities (of Ontario).

Objective: To describe the investigations and the studies undertaken, and to present the recommendations of the above committee.

Method: Questionnaires were distributed to all municipal electric utilities in Ontario. Data finally analyzed came from 1,111 apartment buildings containing 48,632 suites. The benefits and costs of the two policy options (bulk and individual metering) were compared to determine the overall net benefit (or cost) to Ontario as a whole.

Variables: Dependent: electricity/gas consumption

Independent: type of metering, energy source (natural gas or electricity)

Multiple regressions and analysis of variance were performed.

Findings/implications: The amount of suite consumption attributable to bulk metering was approximately 660 kW·h (gas) and 2,900 kW·h (electricity), or 13.7% and 19.7% of the mean suite consumption respectively. These data were used to evaluate the merits of individual metering for the overall economic welfare of Ontario citizens. Individual metering involves tangible benefits (energy and capacity benefits), tangible costs (installation, contracting, operation, maintenance and administration), tangible benefits and costs (conservation and external benefits and consumers' surplus costs). The analysis determined that an overall net benefit of $19 million would be realized if Ontario moved to individual metering for new apartment buildings. Nonmonetary gains would also be realized. Conversion of existing buildings would yield net costs of about $500 million, depending on conversion costs.

5610

Orski, C. Kenneth

1974 The Potential for Fuel Conservation: The Case of the Automobile.
Transportation Research, 8, 247-257.

Abstract: This paper examines the extent to which opportunities exist for energy conservation in the automobile sector, which accounts for one-third of all petroleum consumed in the United States. The problem is becoming critical; not only is the fuel efficiency of the typical automobile among the lowest of all transport forms, but the transport sector itself has little potential for switching to alternative energy sources. The need to devise ways of limiting demand and conserving energy is thus extremely apparent.

One alternative is restrictions on driving, widely adopted in European nations. But the effects of a Sunday ban on driving, for instance, are mixed in that gasoline consumption can be effectively curtailed but at the very real risk of adverse impacts on the recreation and service industries. Still, it is an option of considerable flexibility and therefore worth considering. A related approach is to limit the supply of fuel, for example, to set limits on the amount of gasoline to be sold, enact a weekend ban on gas sales, or conduct fuel allocation or rationing. Many economists favour a different solution: increasing the price of fuel or taxing it heavily. But the potentially inequitable impacts of this policy and the fact that short-term demand for gasoline is considered inelastic must also be noted. Another opportunity lies in mass transit; many believe that the key to reducing the present-day dependence on the car is to improve both the service and quality of public transportation. While several promising alternatives are discussed, the acceptance of such a program by consumers in the short term is questioned. Consequently, the dominance of the private passenger car must be dealt with.

In this regard, several strategies are discussed: (1) promoting higher occupancy of cars through both time saving and financial incentives (which will also reduce pollution and thereby enhance the environment); (2) introducing public automobile services, such as shared taxis or group riding; (3) reducing maximum speeds; (4) improving trafic flow; and (5) improving vehicle maintenance.

Orski, C. Kenneth (cont.)

Another area of opportunity lies in vehicle design, where the focus should be on reducing auto weight, eliminating unnecessary convenience devices and improving engine design. Advertising emphasis in the car industry today is focused not on performance and luxury but on economy, smallness and conservation.

Several government actions are suggested and analyzed, such as: (1) requiring manufacturers to state the fuel economy of their cars; (2) imposing a tax, penalizing buyers of vehicles with poor fuel economy, as well as other taxes; and (3) establishing minimum permissible miles per gallon standards. Long-range policies include promoting sales of electric cars, developing novel fuels, changing land-use patterns (to reduce travel needs) and improving communications as a substitute for travel.

Finally, certain trends are projected. The short term will see an increased popularity of the smaller car, and the medium term will see increased use of public transportation systems. Innovative car designs are also imminent. So even though the energy problem may subside, the impact on the automobile is seen to be permanent. The potential for conservation is indeed wide and varied.

6005

Pacific Gas and Electric Company (PG & E)
1979 Progressive Analysis of Conservation Effort.
Market Research Report 79-1, PG & E, Concord, Calif.

Objectives: (1) To monitor changes in conservation awareness, attitudes, behaviour and knowledge; and (2) to measure changes in appliance saturation and customer demographics

Method: In-home interviews were conducted with 1,000 PG & E single-family homeowners in January 1979.

Variables: Various energy-related attitudes and behaviour

Findings/implications: Sixty-three per cent felt the energy situation would worsen within the next 12 months, 19% said it was more difficult to save energy and 37% claimed to be making an effort to use less energy. Sixty-seven per cent were willing to take part in a peak-load program. The majority of homeowners were unconvinced that business and industry were doing their part to save energy. Awareness of solar energy equipment was high (95%). There was minimal interest in an installment payment plan for utility bills (25%).

6010

Pacific Gas and Electric Company (PG & E)
1979 Insulation Program Concept Test.
Market Research Report 79-4, PG & E, Concord, Calif.

Objective: To gather information on current knowledge and perceptions of insulation

Method: Six group focus interviews were conducted in the San Francisco area in March 1979.

Variables: Motivation for installing insulation; interest stimulated by the four concepts in the Insulation Program (Insulation Financing Program, Direct Sales Program, Free Water Heater Blanket/Showerhead Program, Computer-Assisted Home Energy Survey Program)

Findings/implications: The primary motivator to insulate was the money that could be saved on utility bills. Consumers wanted assurance that PG and E had honest motives in the promotion of these programs, and they also wanted to know how these programs would affect the cost of utilities. The Computer-Assisted Home Energy Survey Program (in-home energy audit) generated the most favourable response, while the Free Water Heater Blanket/Showerhead Program stimulated little interest. The financing programs demonstrated merit, but they should be developed so that PG & E is not viewed as being involved in the "money-lending" business.

6015

Pacific Gas and Electric Company (PG & E)
1979 Multi-Dwelling Unit Solar Equipment Incentives Study. Market Research Report 79-19, PG & E, Concord, Calif.

Objectives: (1) To measure awareness, understanding and interest in solar energy applications; and (2) to evaluate a series of financial incentives to promote the sale of solar equipment for apartment units

Method: Three focus groups interviews were conducted with owners and managers of multidwelling unit complexes. Individuals in two groups had no solar applications; those in the other group did. A total of 19 persons participated.

Variables: Interest in solar, satisfaction with solar equipment, attitudes about government involvement in the solar industry, knowledge of existing tax credits

Findings/implications: Those who had purchased solar systems had done so for economic reasons. Nonowners were concerned about solar technology and whether or not the systems worked. Most felt solar was more appropriate for new construction. Owners were generally satisfied with their system's performance. Those involved in the discussions were divided in their opinions about government and utility involvement in solar development. They were also confused about existing tax credits. Respondents were interested in government or utility programs for system financing.

6020

Parry, M.J., and R.J. Irving
1980 Thermal Comfort in the Home.
Journal of Consumer Studies and Home Economics, 4, 179-191.

Abstract: This paper points out the complexities of the human response to temperature and its relationship to thermal comfort, while indicating which variables the family may alter to achieve this state. The way in which the human body responds to temperature is described (thermoreception and thermoregulation). Techniques used in the research on thermal comfort have included direct determination of preferred temperature, field surveys, and the use of rating scales in environmental chambers. Parameters which have the greatest impact on thermal comfort are air temperature, mean radiant temperature (temperature of the surrounding surfaces in any environment) and air velocity. Knowledge of human behaviour and comfort levels should aid those who are attempting to reduce residential energy consumption.

6025

Pindyck, Robert S.
1980 International Comparisons of the Residential Demand for Energy.
European Economic Review, 14, 1-24.

Objective: To identify long-run price elasticities of the demand for various energy sources

Method: A model of residential energy demand is used in which consumers allocate expenditures among six consumption categories (including energy) and also allocate expenditures across fuel types. Pooled time series-cross section data from 1960 to 1974 for the following nine countries are used to estimate the model: Belgium, Canada, France, Italy, the Netherlands, Norway, the United Kingdom, the United States and West Germany.

Variables: Dependent: consumer expenditures; consumption category: apparel, durable goods, food, transportation and communication, energy, other; fuel: oil, gas, coal, electricity

Independent: energy prices

Findings/implications: None of the own-price elasticities for energy are significantly different from -1. The smallest elasticity is for food (about -1.04) and the largest for durables. Own-price elasticities for coal and oil are close to -1 for all countries, while those for gas are larger (-1.5 to -1.98) and vary across countries. Elasticities for electricity for three countries are positive. The long-run own-price elasticity of the demand for energy is estimated to be -1.10. This estimate is larger than many would have supposed. The most effective policy instrument available to limit the growth of energy consumption and prevent energy shortages is the price of energy. Prices in the United States should be allowed to rise to world levels.

6030

Pitts, Robert E., John F. Willenborg, and Daniel L. Sherrell
1981 Increasing Gasoline Prices.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 205-212.

Objective: To further the understanding of how persons have reacted to the increasing price of gasoline in an environment of perceived energy shortages in many different components of society

Method: Data were collected from a consumer panel in South Carolina over the period 1973-79. A total of 260 responded to all questionnaires (12), with 217 being included in the analysis. Households were classified into four adaptive behaviour groups.

Variables: Dependent: adaptive behaviour group:
(1) inventory and miles decreased;
(2) inventory decreased only;
(3) miles decreased only;
(4) neither decreased;
intentions to drive at various gasoline prices

Independent: demographics, values, number of miles driven, size of auto inventory (total number of cylinders)

Findings/implications: Total miles driven and average cylinder size of inventories decreased towards the end of the study (1979). Group 1 behaviour was exhibited by 11% of the households in the 1973-75 period, but by 25% in the 1975-79 period. Corresponding figures for Group 4 behaviour were 35% and 15%. Three demographic variables proved important: race, size of family and years of formal education of the household head. Three values were significant: comfortable life, family security and exciting life. Group 1 households can be characterized as follows: predominantly white, larger family size, spouse employed and greater than average education level. Stated intentions to consume revealed less sensitivity to increases in price in 1979 than in the earlier years. Generally, it seems that gasoline price increases do not discourage driving except among specific segments whose financial condition will not accommodate the higher prices. More alternatives for adaptive behaviour should be offered by policymakers. It should be remembered that all segments will not react similarly to policy implementations.

6035

Pitts, Robert E., John F. Willenborg, and Daniel L. Sherrell
1979 Rising Energy Costs and Adpative Consumer Behavior -- A Segmentation Approach.
In N. Beckwith et al., eds., 1979 Educators' Conference Proceedings. American Marketing Association.

Objective: To examine consumer reaction to rising prices of gasoline and automobiles

Method: Data were supplied by the University of South Carolina consumer panel over the period January 1975 through August 1978. A total of 322 households (of 780) provided usable data on all questionnaires (six). Households were divided into three groups: (1) those decreasing annual miles driven from the previous year by 1,000 or more; (2) those increasing mileage by 1,000 or more; (3) those with less than a 1,000-mile difference.

Variables: Dependent: automobile inventory (defined by number of cylinders), use of self-service gasoline, number of miles driven

Independent: demographics, group

Findings/implications: Those who drove more in 1976 than in 1975 tended to drive less in 1977, and vice versa. Comparing 1975 to 1977, those driving less in 1977 decreased mileage substantially (15,484 in 1977 vs. 24,607 in 1975). Those driving more in 1977 increased mileage considerably (30,617 in 1977 vs. 20,370 in 1975). Those driving more in 1976 than in 1975 significantly decreased average cylinder size. Those with no change in mileage driven consistently had the largest average cylinder size. Those driving less in 1977 than in 1975 increased average cylinders, and vice versa. Those increasing miles driven were much more likely to purchase self-service gasoline. Those decreasing mileage during 1975-77 tended to have lower incomes, to be older and to have no children at home. Those decreasing average cylinders were above average income and at the final "full rest" or "empty nest" life cycle stage. Steadily rising gasoline prices alone will not reduce miles driven or gasoline consumption. Policies uniformly stated and administered will not affect all households in the same way or to the same degree.

6040

Plum, Roger A., and Jerry L. Edwards
1980 Attitudes Toward Ride-Sharing: 3M Center Case Study. Traffic Quarterly, 34, 8, 287-304.

Objective: To investigate the reasons behind the apparent lack of success in the 3M carpooling program, as opposed to the enormous success in its vanpooling program

Method: Surveys were distributed to over 2,300 employees at the 3M Center, including all vanpool members. Usable returns were obtained from 1,015: 50% were from vanpoolers, 10% from carpoolers and 40% from solo drivers.

Variables: Dependent: van/carpooler, solo driver

Independent: socioeconomics; attitudes (as measured on a four-point agree-disagree scale) regarding van/carpooling; reasons for/against ride-sharing

Findings/implications: Six factors emerged as important from the attitude statements: restriction of personal freedom, longevity, auto ownership and competition for family auto, travel cost, interpersonal relationships and distance from home to work. Solo drivers tended to agree more that ride-sharing had drawbacks: the additional time required to pick up riders, not being able to run errands, having to depend on others and having to leave the same time each day (managerial employees agreed more often with this statement as well). Vanpoolers more than carpoolers agreed that the fact that carpooling was cheaper than driving alone made ride-sharing worth the effort. A number of solo drivers said they would not join a pool regardless of the cost of gasoline. Reasons against pools most often mentioned included lack of flexibility in arrival/departure times, no transportation available during the day and aggrevation created by waiting for late pool members. Positive aspects mentioned included elimination of the need for a second car, and door-to-door service (better than public transit). Recommendations included: (1) reducing the important objections to carpooling by providing transportation for job-related trips during the day, and encouraging adherence to a rigid working schedule; (2) emphasizing the positive aspects of pooling (not having to drive every day during the winter, less costly); (3) personalizing the carpool matching program.

6045

Powlesland, Steve

1979 The Road We Took: Evaluating the Impact of Conservation Programs in California.
In R. Fazzolare and C. Smith, eds., Changing Energy Use Futures: Volume I. New York: Pergamon Press.

Abstract: The California Energy Commission established a monitoring and evaluation unit in 1977, which functioned for ten months. Evaluation is important to a state energy agency because one cannot gauge program effects by changes (reductions) in energy demand. This is because: (1) there are many influences besides conservation programs which can lead to reduced energy demand; (2) an energy demand not equal to that forecasted does not necessarily mean successful or unsuccessful conservation programs; and (3) energy conservation is not necessarily the same as reduced energy demand. Conservation means increasing efficiency, or making more productive use of our energy supplies. Evaluation of the program is critical to prevent incorrect decisions from being made. There are a number of difficulties involved: (1) separating the impact of the program from effects of other programs and activities affecting the same sectors; (2) measuring indirect impacts; and (3) obtaining reliable data on energy usage and detailed comparative data. Parts of a successful program evaluation include a strong commitment to gathering empirical data, institutional cooperation, measurable objectives and enough time to do the job properly.

6405

Quelch, John A.
1980 Energy Conservation Policies for Builders' Purchases of Domestic Appliances.
Energy Policy, 8, 2, 125-137.

Abstract: A substantial quantity of energy is consumed by equipment which is purchased by builders for installation in new housing. In order to regulate such actions, policymakers need information on the industry structure and the decision-making process of the builders. The latter includes, in the case of appliances: (1) the selection of appliances to install (washer, dryer, fridge, stove, dishwasher); (2) the choice of fuel (relevant for some appliances, but more important for furnaces and water heaters); (3) the choice of equipment specifications (size, design, colour, features); (4) the source(s) of supply; and (5) the criteria for selecting a supplier. A survey of Canadian builders revealed significant support for government intervention with respect to the energy issue. Builders felt that equipment manufacturers should assume major responsibility for reducing energy consumption by domestic equipment. The most favoured interventions included energy-efficiency standards, tax credits for the purchase of energy-efficient models and information campaigns to educate consumers. Three types of leverage can be used in effecting interventions: (1) message, (2) financial, and (3) mandatory. The complexities involved in implementing tax credit and sales tax programs suggest that financial leverage might not be effective. The impact of information campaigns is questionable. Policymakers can most effectively influence builders to buy more energy-efficient equipment by: (1) developing equipment performance standards; (2) ensuring that such standards are rapidly incorporated into building codes; and (3) requiring that all equipment installed by builders in all new publicly financed housing meets these upgraded standards. Information campaigns aimed at consumers could indirectly influence builders' choices.

6805

Raju, P.S.
1980 Using Consumer Input in Energy Policy Design: An Empirical Illustration.
Working paper, College of Business Administration, University of Illinois at Chicago Circle.

Objective: To outline methods for studying perceptions of energy policies in terms of preference, effectiveness and influence on specific conservation behaviours

Method: Questionnaires were mailed to 1,000 respondents in the summer of 1978, and 544 usable returns were obtained. Conjoint analysis was used to derive preference and effectiveness utilities for individual policy elements, while multidimensional scaling was used to examine overall perceptions of policies and conservation behaviours.

Variables: Dependent: preference utility (for policy); perceived effectiveness of policy; influence of policy on likelihood of performing specific conservation behaviours; general attitudes towards the energy crisis

Independent: policies: tax credit for home insulation, increase in daytime electricity rates, gasoline tax increase, price increase for home heating fuel; level of implementation (e.g., price increase of 0%, 10% or 20%)

Findings/implications: Liking for a policy varies almost on a linear basis over the levels of the policy elements. Other than the tax credit for home insulation, all policy elements exhibited nonlinear increases in effectiveness utility over the levels (a 10% increase in gasoline tax was perceived to be almost as effective as a 20% increase). Policy elements affect related conservation behaviours (increased electricity rates affect appliance usage, buying energy-efficient appliances, etc.). Policy elements may discourage behaviours not directly related to the policies (e.g., a tax credit on insulation discourages the buying of economical cars). Consumers are more likely to perform the "easier" behaviours. The calculation of utilities enables comparisons to be made between alternative energy policies in terms of consumer preference for them and their effectiveness.

6810

Rankin, William L., and Stanley M. Nealey
1978 The Relationship of Human Values and Energy Beliefs to Nuclear Power Attitudes.
Battelle Human Affairs Research Center, Seattle.

Objectives: To investigate: (1) the relationship of human values to one's attitude about the continued development of nuclear power; and (2) the relationship of general energy beliefs and beliefs about specific nuclear power issues to one's attitude about the continued development of nuclear power

Method: Three samples were drawn: (1) 1,350 Washington State households ("general"); (2) 150 households in areas close to nuclear plants plants ("nuclear neighbours"); (3) 100 members from a statewide environmental organization ("environmentalist"). Mailout surveys were used to collect data. Returns from the three samples were: (1) 600 (48%), (2) 71 (52%), (3) 57 (63%).

Variables: Dependent: nuclear attitude (pro, anti, neutral), nuclear knowledge (low, medium, high)

Independent: values, energy beliefs, nuclear power beliefs

Findings/implications: Antinuclears place more importance on the values of a world of beauty and equality. Pronuclears place more importance on the values of a comfortable life, family security and national security. Pronuclears have value systems more like the "average" American. From 10% to 30% felt that nuclear power helped them attain the values of a comfortable life, a world of peace, family security, freedom, national security and pleasure; 5% to 16% felt that nuclear power blocked the attainment of the values of a world of peace, a world of beauty, family security, freedom and national security. Pronuclears believe the U.S. economy will decline without increased energy production (antinuclears are unsure). Antinuclears believe paying more attention to conservation will make increased electrical power production unnecessary. Pronuclears disagree. Antinuclears believe solar power will provide a large share of future energy needs. One's belief about the safety of nuclear power plants is the best predictor of one's nuclear power attitude. Pronuclears believe nuclear has a good safety record, are not against waste disposal in Washington State, and believe coal plants are much worse environmental polluters. Even though antinuclears are presently opposed to nuclear power, a sizable minority believe it should be developed for possible use in the future.

6815

Redinger, Robert, and Richard Staelin
1981 Refrigerator Energy Labels.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 286-292.

Objectives: (1) To test the validity of the payback model in a controlled task as similar as possible to the actual shopping environment; and (2) to estimate the effects of various market variables on the consumer's decision process and on the probability of his purchasing an energy-efficient appliance

Method: One hundred and twenty-three subjects took part in a simulated shopping task. They looked over ads, completed a preshopping questionnaire and "shopped" in one of two showrooms (1979 environment vs. 1981 environment). Salespersons offered help, pushing one of two model types. Subjects "chose" a model (out of 12 alternatives). Salespersons completed questionnaires re subjects' buying decisions. Subjects completed a post-shopping questionnaire as well.

Variables: Dependent: model chosen (second and third choices as well); salesperson's perceptions re importance of product attributes

Independent: Ads: (two types): one stressed energy-efficiency and annual operating costs, the other features of the refrigerators; salespersons' approach: energy-efficient models stressed, or deluxe models: showroom (1981 models had increased energy efficiency, prices and labelling); buyer's attitudes and behaviour re energy conservation; socioeconomics; demographics

Findings/implications: When presented with operating cost information, people made choices that were consistent with a payback decision model. However, when other factors are introduced (salesperson's push), payback does not provide a good indication of the choices people will make. There may have been some trading up (people "buying" a more expensive refrigerator than they would in a real life situation). Only the salesperson had a significant effect on the probability of the consumer's purchasing an energy-efficient regrigerator. Labels tended to decrease the probability of purchasing an energy-efficient refrigerator, though the effects were not significant. Advertisements tended to increase the probability that an individual would buy an energy-efficient refrigerator. People made aware of the high operating costs of a

Redinger, Robert, and Richard Staelin (cont.)

refrigerator tended to buy a cheaper (less efficient) model so they would be able to afford the operating costs later. People should be informed that they should view higher initial prices of efficient models as investments for reducing future costs. Salespeople tended to help consumers in their understanding of the trade-off between energy savings and price. These salespersons should be enlisted on the side of the government's objective to sell more energy-efficient appliances.

6820

Regens, James L.
1980 State Policy Responses to the Energy Issue: An Analysis of Innovation.
Social Science Quarterly, 61, 1, 44-57.

Objective: To explore the extent to which states have opted to pursue an active as opposed to a passive role in energy policymaking

Method: A survey of all 50 state energy agencies was conducted in 1978 to see if they had implemented any of seven nonfederally mandated policy measures. Discriminant analysis was used to predict these innovations based on a number of structural characteristics.

Variables: Dependent: implementation of (1): state funding for research and development projects, (2) comprehensive energy resource development plan, (3) state-sponsored demonstration projects, (4) tax incentives for industry, (5) tax incentives for individuals, (6) forecasting/modelling, (7) interstate cooperative energy resource development agreements

Independent: industrialization, affluence, energy consumption by end-use sectors, population size, relative energy self-sufficiency, climate, public opinions re energy

Findings/implications: Only 6% of the states had not adopted any of the seven measures, but none had adopted all seven. Fifty-five per cent had adopted at least three. Energy-consumption levels, relative state energy self-sufficiency and population size were the most discriminating predictors. Interestingly, public opinion was largely unrelated to the actions of policymakers. This may explain in part why (or be a reflection of the fact that) efforts to address the energy problem have focused primarily on "technical fix" operations.

6825

Reichel, David A., and E. Scott Geller
1980 Applications of Behavioral Analysis for Conserving Transportation Energy.
In A. Baum and J. Singer, eds., Advances in Environmental Psychology, Volume III: Energy Conservation: Psychological Perspectives. Hillsdale, N.J.: L. Erlbaum Associates.

Abstract: Behavioural interventions to conserve transportation energy have been directed toward three categories of transportation behaviour: driver habits, ride-sharing and public transportation. Changing driver habits includes reducing vehicle-miles of travel and encouraging fuel-saving driving. Programs to promote ride-sharing have included priority lanes for carpoolers (enforcement problems and adaptive behaviour have hampered effectiveness), preferential parking and organizational efforts (may be ineffective without incentives to carpool). Inconvenience seems to be a major deterrent to carpooling. Sociological and psychological influences may be important in the initiation and maintenance of the carpool. A notable vanpooling program was implemented by the 3M company in St. Paul, Minnesota. Research efforts in the future should be cognizant of the following: (1) research should be directed at noncollege populations in noncollege environments; (2) a total community transportation package warrants consideration; and (3) employer-sponsored van/carpool programs seem to have tremendous potential. The need for mobility might be decreased by making the home environment more reinforcing and efficient in meeting family needs. Conserving behaviour must be made expected, socially valued and socially rewarded.

6830

Renshaw, Edward F.
1981 Recession in the U.S. Motor Industry and the Quest for Fuel Economy.
Energy Policy, March, 20-24.

Abstract: It is suggested that placing a "bounty" on older fuel-inefficient cars traded in for new U.S. made fuel-efficient ones would both revitalize the automobile industry and save gasoline. This is also a socially desirable policy in that it will aid lower-income groups who tend to drive older, more fuel-inefficient cars and who are most affected by rising fuel prices. In the United States from 1963 to 1977 the number of automobiles on the road grew 2.5 times as fast in absolute numbers as did the human population. It is implied that the United States may now be close to motor vehicle saturation and that the domestic motor industry could remain in a profound and prolonged slump. A "bounty" on used cars traded in for new ones could be financed out of a modest increase in import duties.

6835

Response Analysis Corporation
1977 Communications Effectiveness of Energy Consumption Labels for Major Appliances.
Study conducted for Federal Trade Commission.

Objective: To determine the communications effectiveness, among potential purchasers of major appliances, of labels expressing energy conservation information in different ways

Method: The study consisted of two phases. In the exploratory phase, six focus group sessions were held to guide the choice of procedures to be used in the next stage. In the quantitative stage, 120 subjects in each of four metro areas in the United States completed questionnaires on the energy labels. There were three appliances and eight labels (2 x 2 x 2) involved. The labels differed on three dimensions: simple vs. complex, verbal vs. numeric mode (for cost information) and heading.

Variables: Dependent: attitudes or ratings concerning the capacity of the label to assist in the purchasing decision, to convey information clearly and to attract consumers; cognitive: ability to obtain information correctly from label

Independent: attitudes re the energy situation; appliance ownership; factors considered when making purchase decision; labels: simple vs. complex (in terms of amount of cost information presented), verbal vs. numeric mode, headings (Before Buying Compare Energy Costs or Save Dollars Conserve Energy); appliance: refrigerator, dishwasher, air conditioner

Findings/implications: There was little difference in the effects of the simple-complex variable. Complex labels will probably be superior once people are exposed to them a number of times. Results for the verbal vs. numeric test were ambiguous and sparse, but it would appear that both are equally effective. For the headings, Heading I was more favourable when used with the simple label, while Heading II was more favourable when used with the complex. Although the evidence was not definite, on the whole, Heading II appears to be somewhat superior. Favourable evaluators on the various dimensions were: capacity to assist in purchasing decision, 67%; capacity to convey information clearly, 72%; capacity to attract customers, 55%; capacity to provide right amount of information, 67%. A majority (83%) correctly figured out the likely energy costs using the complex chart (label). Choices

Response Analysis Corporation (cont.)

reveal that people conceptualize recoupment (life cycle cost) and take it into account in purchase decision making. The cost/brand preferences are more important than energy conservation as factors in the purchase decision. Costs may, however, include energy and operating costs. Overall, the design of the labels is judged to be satisfactory. It is recommended that the complex label and the second heading be used (no recommendation is made on the verbal vs. numeric mode). Consistency is important in the labels, as similar labels will, over time, reinforce learning.

6840

Richman, Al
1979 The Polls: Public Attitudes Toward the Energy Crisis. Public Opinion Quarterly, 43, 576-585.

Objective: To review the American public's attitudes towards the energy crisis in terms of perceptions of the problem and preferences on how to deal with it

Method: Various polls, including Roger, Gallup, Harris and CBS/New York Times, are reviewed for the 1974-79 period.

Variables: Belief in crisis, blame for crisis, concern about future supplies, belief about future developments, favoured solutions, attitudes towards nuclear power

Findings/implications: Fewer people believed that the crisis was real in 1979 than did in 1977. Over half felt it was contrived. Public concern about dependence on foreign supplies also lessened, and only 51% thought that the United States imported oil. An increasing percentage placed the major blame for the crisis on the oil companies and the Arabs. A large percentage (86%) were somewhat/very optimistic that the United States would solve the crisis by technological discoveries and development. By the year 2000, people believed that solar energy would supply 32% of electricity needs, and nuclear 27%. Those favouring increased production as a means of coping with the crisis outnumbered those favouring conservation 2:1. The Three Mile Island incident dampened enthusiasm for the construction of nuclear power plants, especially if the plant were to be built in the respondent's community.

6845

Rinehart, Robert D.
1980 Energy Audit Case Study for Hospitals.
Energy Engineering, 77, 4, 38-49.

Abstract: This paper outlines a number of changes which could be made in a New Jersey hospital and their resultant impact on energy use. There are a number of maintenance and operating procedures which could be implemented at a cost of $11,500 and save $88,000. Included, among others, are: adjusting space temperatures (annual cost saving, $9,800), reducing O.A. heating ($24,500), shutting down unoccupied areas ($5,320), and adjusting and cleaning boilers ($32,500). The feasibility of installing solar heat recovery systems was investigated, but payback periods were calculated to be in excess of 20 years. Various measures involving modifications to the existing buildings were examined. Included, among others, were: insulation of roof (annual saving, $2,500, cost $10,000), installing storm windows ($11,000, $80,000), installing heat recovery system ($35,000, $200,000), installing water flow restrictors ($4,000, $6,000), and installing automatic boiler controls ($24,000, $61,000). Total annual savings from all adjustments are $220,000 or 19% of 1978 consumption and costs. Capital projects account for 60% of the savings.

6850

Ritchie, J.R. Brent
1979 Leisure Activities and Energy Consumption -- A Review. Prepared for Consumer and Corporate Affairs Canada.

Abstract: Total energy requirements for participation in leisure activities are viewed as being composed of direct, indirect, maintenance and travel elements. A large number of activities require relatively little energy, and greater participation in these activities offers potential for conservation. Those activities including or requiring travel (e.g., golf, alpine skiing) appear to represent the most serious drain on energy resources. Reducing energy consumption of these activities might involve reducing participation levels, switching to more efficient travel modes and encouraging more efficient use of existing travel modes. Certain activities require large, energy-intensive facilities (e.g., hockey, curling). Such facilities should be energy efficient in terms of construction and should also be efficiently utilized in terms of the percentage of time they are occupied. Barriers which must be overcome before consumers can be induced to change to low-energy-intensive activities include nonperception of a serious energy crisis/shortage, belief that technology will solve the crisis, opposition to direct government intervention, the nature of the Canadian climate, distances between origins and destinations and unwillingness to change lifestyles. It is possible as well that any dollars saved by consumers through direct energy conservation will simply be spent on other goods. Research should be conducted to develop empirical measures which would provide an understanding of the benefits derived by consumers from various leisure activities, and provide more information about the physical and psychological barriers hindering greater participation in lower-energy-intensive activities.

6855

Roessner, J. David, et al.

1979 Applicability of Diffusion Research to Solar Energy Policy Issues.

Solar Energy Research Institute, Golden, Colo.

Abstract: This paper assesses the ability of diffusion research to supply information requirements for two questions: estimating the future market success of solar energy technologies, and devising programs to promote the adoption of solar energy most effectively. There are a large number of variables which have been identified as influencing the innovative behaviour of individuals and organizations and the extent and rate of diffusion of innovations. There is little generalized knowledge that could be applied directly to the problems facing policymakers. Mass media are important for creating awareness about innovations, while interpersonal channels are more important in changing attitudes towards the innovations. Innovators are less sensitive to price and social-psychological risks. The importance of these two factors increases in later stages of diffusion. In the case of solar heating, diffusion research can determine the major problems that must first be solved: high first cost, lack of information, inadequate warranty protection or the complexity of the technology. Appropriate government action that could be taken includes subsidies, demonstration programs, information dissemination, or research and development. Investigations of diffusion and market penetration will lead to more accurate estimates of the market penetration of energy technologies and ultimately to improved policy decisions.

6860

Roger Seasonwein Associates, Inc.

1980 Putting Energy Conservation to Work: American Attitudes on Conservation and Government Programs to Encourage More Efficient Energy Use.
Prepared for Union Carbide Corporation.

Objective: To test public support for enlarging conservation's role in the nation's near-term energy policy

Method: A national (U.S.) telephone survey of 1,000 adults was conducted in November 1979.

Variables: Reported conservation behaviour, assessment of various government policies, assessment of industry's role in conserving energy, beliefs about the impact of conservation on living standards, intentions to conserve

Findings/implications: Conservation is considered to be fast, inexpensive and environmentally acceptable. However, 48% believe that saving energy will require cutbacks in their standard of living, and 74% fear that such cutbacks will favour certain people or groups. Many (82%) reported executing one or more projects to improve the energy efficiency of their home. Although 79% were aware of a $300 tax credit, only 3% said it was extremely important in making the decision to conduct the project. Cost is perceived as the most important obstacle faced in improving homes. About half believe that industry will move on its own to become more energy efficient in production, and 47% favour government assistance for such action.

6865

Rothstein, Robert N.
1980 Television Feedback Used to Modify Gasoline Consumption. Behavior Therapy, 11, 683-688.

Objective: To provide feedback on gasoline consumption through television technology and to monitor the results

Method: A local television station in Midland-Odessa, Texas (population 300,000), ran a graph every weekday evening during the summer of 1979 showing the number of gallons of gasoline consumed since 3 p.m. the previous day. The announcer would give a conservation tip and commendation during the 30 seconds that the graph remained on the air. A random sample (N = 18) of the 190 gasoline stations in the area was used in the study.

Variables: Dependent: gasoline consumption

Independent: graph of consumption on television

Findings/implications: During the first three weeks of the experiment, gasoline consumption decreased 24.8%, 27.2% and 37.6% respectively. Fuel consumption returned to 75.2% of baseline when the graph was taken off the air for two weeks. A return of the experimental condition once again substantially reduced gasoline consumption. Withdrawal of the graph once again led to an increase in gasoline consumption levels to 84.8% of baseline. The authors note that price increases and more energy-conscious consumers could have had an impact on the results of the study. The authors caution that further research is needed, but their results indicate that feedback through mass media can reduce gasoline consumption.

6870

Rudel, Thomas K.
1980 Social Responses to Commodity Shortages: The 1973-1974 Gasoline Crisis.
Human Ecology, 8, 3, 193-211.

Objectives: To investigate: (1) the ways in which consumers and governments usually respond to shortages; and (2) the effects which the responses and the interaction of the responses have on the society's capacity to cope with shortages

Method: Newspaper reports of automobile driver behaviour in two areas, Atlanta and New York, were studied. As well, data on the availability and sale of gasoline in 48 states during the shortage (as collected weekly by the American Automobile Association) were analyzed.

Variables: Dependent: driver behaviour, political responses

Independent: severity of shortage experienced, as measured by the percentage of gasoline stations out of fuel and by the percentage of stations instituting their own rationing plans

Findings/implications: Individual responses to gasoline shortages are the first to occur: drivers search for gasoline to find where and when it is available. They also fill their tanks more frequently for fear of running out. This strategy compounds lineup problems, leading to chaos. In areas where shortages are more severe, collective actions are taken in response to these driver behaviours. Gasoline stations institute their own system of priorities, perhaps limiting the volume or dollar amount per vehicle. Governments may then invoke a more formal rationing system (most commonly, the odd-even plan). Across the nation, the primary determinant of gasoline-rationing policies was the percentage of gas stations out of fuel. In the 6 states with complete rationing, 13% of the stations were out of fuel and 83% were limiting hours. In the 25 states with no rationing, comparable figures were 5% and 53% respectively. The analysis suggests the need for a more comprehensive and detailed rationing plan. In the face of long term-shortages, consumers could adopt more long-term actions (moving closer to jobs, buying smaller cars, etc.).

6875

Rudelius, William, and Richard Weijo
1980 Energy Conservation for Homeowners: An Action Program for the City of St. Paul.
University of Minnesota, Twin Cities, Minn.

Objectives: (1) To review existing federal (U.S.), state (Minnesota) and local (St. Paul) energy programs and identify those that have apparently been successful; (2) to use data provided by the St. Paul Energy Mobilization Survey to determine what energy conservation actions homeowners have already accomplished, what their future plans are in this area and why they may be reluctant to take action; (3) to estimate the potential energy savings that could occur in the city of St. Paul if various demographic groups of homeowners took specific energy actions; and (4) to recommend actions for the city of St. Paul

Method: The main source of information used in the study was the St. Paul Mobilization Survey, a consumer survey providing information on the in-home and automobile energy consumption of residents of St. Paul, Minnesota. A stratified, random sample of 3,000 respondents was selected for data analysis. Potential energy savings for the sample were calculated.

Variables: Dependent: energy awareness, energy consumption

Independent: St. Paul residents' socioeconomic and demographic variables

Findings/implications: The main incentive for energy actions is to save money, but very few homeowners are really aware of which activities will accomplish this. The authors recommend that households be told, in simple dollar terms, about the costs and benefits of various conservation activities for their own homes, and that appropriate information, technical assistance and financial incentives be provided. It is also recommended that policymakers focus on that group of homeowners who live in larger (three to four bedrooms) houses and have a household head under 60 years of age, whose annual income is over $20,000. The potential energy savings from one-time energy conservation activites should be stressed. The study also includes an exhaustive summarization and description of energy programs (federal, state, local) available to St. Paul and makes recommendations for future programs and research.

6880

Ruffin, Marilyn D., and Mills B. Weinstein
1979 Energy in the Farm Home.
Home Economics Research Journal, 8, 1, 2-15.

Objectives: (1) To identify factors that are related to energy consumption of farm operator households; and (2) to isolate the variation of the household's electricity use, electricity expenditure and total energy expenditure explained by the factors

Method: Analysis is based on data collected by the U.S. Department of Agriculture for the 1973 Farm Operator Family Living Expenditure Survey. Interviews were conducted with 3,252 operators in 38 states. Only those households who paid for their energy directly and who lived in an electrified single-family home were included in the analysis (N = 2,539).

Variables: Dependent: quarterly electricity expenditure, monthly electricity use in kilowatt hours (estimated from expenditures), total annual energy expenditures

Independent: level of total expenditures; farm-business share of expenditure; usage patterns (all electric, some gas, some fuel oil, etc.); ownership of appliances, including portable heaters; electricity rate; age of household head; size of household; number of full-time wage earners; climate

Multiple regression was used to assess the effects of the independent variables.

Findings/implications: Values of R^2 were quite low (.14, .13) in explaining the variation in summer energy use; other findings noted pertain only to spring and winter. The independent variables, excluding climate, generally explained between 30% and 40% of the variation in the dependent variables. The most important variables were usual level of expenditure and types of fuels used. Other variables such as lifestyle, size and efficiency of equipment, and design and construction of the dwelling may account for large parts of the variation. Household energy consumption must be understood in order to properly evaluate the fairness of energy policies to various population segments.

6885

Runnion, Alex, Jesse Watson, and John McWhorter
1978 Energy Savings in Interstate Transportation Through Feedback and Reinforcement.
Journal of Organizational Behavior Management, 1, 180-191.

Objective: To improve driver performance in terms of miles per gallon and amount of fuel obtained at company terminals

Method: The program took place in a large textile company's transportation division, one which employed 195 drivers. Baseline consumption was monitored for a period, then treatments were instituted for two years.

Variables: Dependent: treatment (included instruction on how to achieve higher mpg, publicly posted graphs on mpg for the company and individual drivers, letters commending drivers individually for good performance, social reinforcement from managers and, in Year 2, draws for prizes for those achieving certain performance levels)

Independent: average mpg, percentage of fuel obtained at company terminals

Findings/implications: Mpg was 5.06% above baseline during Year 1 for intermill drivers and 4.18% above baseline in Year 2. Long-line drivers increased mpg 2.1% and 9.0% above baseline for the two years. Amount of fuel obtained at company terminals was increased from 30% to 48% of total consumption. Research is required on the differential effects of individual vs. group feedback, and on the effectiveness of various schedules for the delivery of reinforcement and feedback.

7205

Sacco, John F., and Hatim M. Hajj

1976 Impact of the Energy Shortage on Travel Patterns and Attitudes.
Transportation Research Record No. 561, Transportation Research Board, National Academy of Sciences, Washington, D.C., pp. 1-11.

Objective: To examine the effect of the energy shortage on driving habits, modal shifts and residents' attitudes towards the seriousness and duration of the problem and their preferred solutions. Special emphasis is given to the study of the feasibility of public transit

Method: An analysis of travel attitudes and patterns of people in the Dutch Fork area in Columbia, South Carolina, was obtained from two surveys: one conducted by phone in 1972 and the second through personal interviews in 1974 (318 households). Supplemental data from nationwide experiences were also included to obtain a more general picture of the effects of the shortage.

Variables: Dependent: attitudes towards, and awareness of, energy crisis; intentions to change behaviour as a result; gasoline consumption

Independent: energy price changes, supply restrictions, availability of alternative modes

Findings/implications: Most people reported little or no reduction in driving; only 16% said they had made considerable reductions. Higher declines were reported on the weekends, and most reductions occurred on the least-necessary trips. The reductions lessened once gasoline lineups grew shorter, indicating that supply problems have a greater effect on the amount of driving than does price. This is underlined by the fact that transit ridership began to decrease when gas lines dwindled, even when gas prices continued to rise. The most popular method to reduce gasoline consumption was to drive slower, followed by reductions in shopping and recreational trips. Few people made frequent use of carpools or buses. This shows that drivers made changes and reductions, but largely of the type that would allow them to continue using their cars. While 40% thought the gasoline situation would be bad in the next few years, only 6% felt it would be critical. Over half the respondents believed the shortage was contrived.

Sacco, John F., and Hatim M. Hajj (cont.)

An obvious implication of these results is that a sudden shift in mode is not likely to occur, and that the impact would be larger if modal choice was greater or the quality of public transit improved. Choices for short-range solutions included transit expansion, rationing, price increases and carpooling, while long-range answers most favoured were increased gasoline production and improved public transit. But most said they would buy an economy car or pay a higher price for gasoline before riding the bus or forming a carpool. Thus, the overall image of public transportation needs considerable improvement before it can be classified as a viable short- or long-term alternative to the auto.

7210

Saha, G.P., and J. Stephenson
1979 An Analysis of Residential Space Heating in New Zealand. Energy and Buildings, 2, 297-307.

Objective: To describe an engineering analysis made to determine the effect of various factors on energy use for space heating

Method: An engineering-economic model that simulates residential energy use from 1976 to 2000 is used to estimate the effects of various conservation strategies on energy use. Three scenarios (high, base, low) are evaluated.

Variables: Dependent: national energy use (six fuels) for residential space heating

Independent: thermal integrity values for housing structures, intensity of use, number of houses insulated, heating appliance efficiency, energy prices, population, per capita income, money supply, scenario (high -- little change in approach to energy conservation, low -- strong conservation measures)

Findings/implications: The average annual growth rates for residential space heating from 1976 to 2000 are estimated to be 3.2%, 1.6% and -0.2% for the high, base and low scenarios respectively. The model does not consider shifts to apartment living, regional differences in some variables, changes in house layouts or construction materials, introduction of solar, or the cost/benefit of the conservation programs.

7215

San Diego Gas and Electric Company (SDG & E)
1976 Solar: Background Attitude and Awareness Study.
Prepared by Marketing Research Department, San Diego Gas and Electric.

Objective: To determine San Diego County consumers' knowledge about solar energy systems, their perceptions of and attitudes towards solar, and their readiness to own a solar system at this point in time

Method: About 400 single-family homeowners (SDG & E customers) were interviewed in-home during August 1976.

Variables: Dependent: awareness of solar, perceptions of availability, attitude towards solar, intentions to buy, perceptions of various aspects of solar

Independent: demographics

Findings/implications: Virtually all respondents were aware of solar as a home heating source. There was no agreement about when solar would be available: 55% said now, but over 30% felt it would be more than five years. Solar was rated highly on an overall basis. Its most frequently mentioned advantage was its effect on lowering utility bills. Another advantage was its being "clean energy," while the major disadvantage was the cost of purchasing and installation. The majority of respondents underestimated the cost. Demand for solar on a retrofit basis was low (21% said definitely/probably would buy), but higher for new homes (59% said they would buy). Interest in solar was greatest among younger (below age 45) groups. The basic market was not, however, highly segmented at the time. There are some aspects which are at present perceived inaccurately (ease of installation, effect of clouds and fog on operation, appearance of system on roof). These would need to be corrected by informational campaigns.

7220

Saskatchewan Power Corporation
1977 1976 Seasonal Cottage Survey.
Business and Public Information, Saskatchewan Power.

Objective: To estimate the saturation of appliances as well as cottage-use patterns

Method: Questionnaires were mailed to 5,794 Saskatchewan Power customers during January 1977; 4,082 usable responses were received.

Variables: Appliances present in cottage, year cottage built, usage of cottage, insulation

Findings/implications: There was an 11.2% increase in the number of cottage customers from an earlier (1974) survey. There was very little change in the saturation of appliances: refrigerator, 98.2%; electric range/rangette, 70.9%; electric heating, 25.2%; electric water heater, 84.1%; television, 69.5%; washing machine, 10.6%. Nearly 70% of the cottages were insulated.

7225

Scheiner, James I., and Stephen A. Keiper
n.d. Car-Pool Information Project: Innovative Approaches Improve Results.
Committee on Urban Transport Service Innovations.

Objective: To evaluate the results of innovative approaches to providing carpool information

Method: Three approaches (an areawide approach, a major employer's program and a labour union participation approach) to the formation of carpool lists were evaluated. The areawide approach utilized mass media to increase public awareness in the Wilkes-Barre urbanized area. The major employer's program was directed at companies with over 200 employees. The union participation method differed from the first two in that it did not require the individual to complete a form in order to be entered in the data bank. An effort was then made to determine the incremental impact of the program to create transit use of carpooling beyond that which was already being practiced. The project dealt with 17,740 employees who were exposed directly to the project either through their employer or their union.

Variables: Dependent: new carpool formation; completion of carpool information forms, requests for information

Independent: the three approaches

Findings/implications: None of the approaches produced much of an incremental increase in carpooling, with the areawide approach proving to be the least effective of the three. The area already had a higher than average carpool and transit usage rate, and as a result the authors were not too surprised in finding that the three programs did not lead to large incremental gains in carpool formation. The disappointing results were also attributed to the lack of incentives for carpooling or disincentives for single-occupant cars. Moreover, during the study, gasoline was plentiful in the area at 50¢/gal.

7230

Schipper, Lee, and Andrea Ketoff
1981 Residential Energy End Use: Developing an International Data Base.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 160-168.

Objective: To summarize work completed on a project which assembled data on residential energy use

Method: Data for seven countries were compiled and analyzed. The countries included Japan, Sweden, Canada, West Germany, France, Italy and the United Kingdom.

Variables: Dependent: residential energy use: space heating, water heating and cooking, electric appliances (on a per capita basis)

Independent: economic structure, lifestyle measures, climate, appliance saturation

Findings/implications: The rapid rise in energy use (particularly electricity) appears caused by rising incomes and increased ownership of energy-using devices. Less growth in energy use is expected in the future. The price of electricity appears to be an important determinant in its use. There would seem to be opportunity for savings by improving the efficiency of energy-using devices and by improving building shell characteristics of homes. There are large variations in energy-use per family, suggesting that behaviour as well as technology might account for the differences. Prices seem to be important determinants of energy use and intensities. More research is required on how consumers change energy use in the face of rising prices, new technologies and more information.

7235

Seaman, Lorna, and Louise Landry
1980 Energy Conservation Initiatives in Fredericton: A Model in Citizen Participation.
Canadian Home Economics Journal, 30, 4, 219-222.

Abstract: This article describes a demonstration energy conservation project conducted in Fredericton (it was conducted in two other locations as well). The purpose of the project was to provide, through public participation, an opportunity for citizens to establish target areas for conservation, goals, strategies and an action plan. One of the important accomplishments was that key sectors of the community were brought together to work on a mutual concern. Committees were formed to deal with various aspects of conservation: a buildings committee composed of representatives of churches, hospitals, government and schools; a recycling committee, which coordinated recycling activities underway in Fredericton and prepared a handbook on recycling; a committee of educators, to develop an energy conservation curriculum for all levels of education; and a monitoring committee, which reported that energy consumption decreased in seven of the first nine months of the project (relative to the previous year). The federally sponsored phase of the program ended in June 1980, but the city appointed an energy conservation coordinator to continue and expand on the programs begun.

7240

Sewell, W.R. Derrick, and Harold D. Foster
1977 Solar Home Heating in Canada: Towards a National Policy. Presented at the General Meeting of the Solar Energy Society of Canada, Edmonton.

Objective: To identify obstacles to the widespread adoption of solar home heating

Method: Almost 1,000 people representing a number of groups were either interviewed or sent a questionnaire. They represented, among others, architects, builders, scientists, media, financial institutions, governments, realtors and the general public.

Variables: Dependent: anticipated use of solar, perceived performance barriers, perceived effectiveness of incentives

Independent: group membership

Findings/implications: Overall it was anticipated that by 2001, 20% of Canadian homes will use solar heating. Most optimistic were solar component manufacturers (40%), while least supportive were utility officials (10%). There was high agreement among groups regarding the seriousness of the more severe barriers, but much less regarding the seriousness of the least severe barriers. The serious barriers included cost of purchase and installation, public willingness to pay, compatibility with older structures, lack of federal support, public environmental apathy and availability of information. Among the least severe were operating difficulties, operating time, social costs and environmental impact. Incentives perceived as most effective were lower mortgage rates, tax deductions for adopters, mass production, government support of research and government subsidization of housing projects. A number of policy actions are recommended.

7245

Shama, Avraham, and Ken Jacobs

1980 Social Values and Solar Energy Policy: The Policy Maker and the Advocate.
Prepared for the U.S. Department of Energy by the Solar Energy Research Institute, Golden, Colo.

Objectives: (1) To identify and define the various values that policymakers and solar advocates associate with solar energy; (2) to cluster and rank order the above values; and (3) to discuss differences between the two groups and the resulting implications

Method: Public pronouncements by the two groups were analyzed to first identify and define the values. The values were then rank ordered by two methods: the proportionate frequency with which each source mentioned/implied each value cluster was identified and qualitative analysis was undertaken.

Variables: Dependent: values: clustered into economic, social, environmental, security and ethical

Independent: policymakers: those responsible for designing, implementing and evaluating solar energy policies; advocates: those outside the government playing an active role in promoting a more rapid adoption of solar energy

Findings/implications: Policymakers attach greatest importance to economic values (52% of all value mentions), followed by environmental, security and social values (17%, 16% and 13%). They appear to place all values in an economically quantitative (cost-effectiveness) form. Qualitative analysis confirmed these findings. Advocates place more equal weights on the value clusters. Economic (33%) and social (32%) values are mentioned most often. They are followed by environmental (24%), ethical (7%) and security (4%). Advocates speak of security, rather than the national security referred to by policymakers. The findings may be useful to policymakers and policy researchers, in that policies can be evaluated in terms of the social values they will bring about or reinforce.

7250

Shapiro, Phillip S., and Richard H. Pratt
n.d. Energy Saving Potential of Transit.

Abstract: This study attempts to estimate possible transportation energy savings for urbanized areas, as well as reductions in vehicle-kilometres of travel for the United States, by extrapolating from estimates for individual, representative cities. The authors caution that their study was designed only to provide macroscale estimates of the possible energy savings in the United States and in various U.S. cities, which should not be considered as detailed forecasts. The energy efficiencies of public transportation in general and of specific urbanized-area transportation modes in particular, were calculated for Albequerque, San Diego, Baltimore and Chicago. The transit excess time, transit running time, cost to the rider of using transit and the cost of operating an automobile were used as the explanatory variables. Various scenarios investigated included decreasing transit fares, decreasing transit running time, increasing gasoline costs, increasing selected parking costs, decreasing transit excess time and decreasing transit wait time. The estimates in this study lead to the conclusion that a reduction in the amount of energy used for personal transportation can be realized through actions designed to shift persons from the automobile to mass transit, but that this is extremely difficult. The potential short-term fuel savings range from 1% to 4% of national urban-area fuel consumption. It is noted that automobile-disincentive strategies generate the estimated energy savings at the least added cost to the transit agency and also lead to carpooling, trip elimination and shortened trips. To conserve energy it is apparent that increased bus coverage and frequency must be instituted in concert with fare reductions, decreased running time and automobile disincentives. The expense associated with this alternative is self-evident.

7255

Shapiro, Stanley J.
1979 Canada's Conserver Society Studies: Their Intellectual and Social Impact.
In Karl Henion and Thomas Kinnear, eds., The Conserver Society. American Marketing Association.

Abstract: This article is a brief review of Canada's two Conserver Society studies, which were conducted by the Science Council of Canada and by the Group Associé Montréal/ Marill pour l'étude de l'avenir (GAMMA). A conserver society is, on principle, against waste, and therefore favours reuse or recycling. One aim will be to achieve reliance on sources of energy which are in principle sustainable. Conserver industrialization will involve not only the development of new energy sources but also more efficient use. The Conserver Society concept has been disseminated in Canada as a result of the two studies and the debate (in the media and at various conferences) which has followed. The initial reaction of business was negative but has softened, as businessmen realize that opportunities will still abound. The government has set energy conservation as a priority. In Canada, the conserver option is making headway at the expense of the prevailing commitment to affluence, growth and mass consumption.

7260

Shippee, Glenn
1981 Energy Conservation and the Role of the Social Sciences. Energy Policy, March, 32-38.

Abstract: The author concludes that it is dangerous to rely solely on technologically based solutions to energy availability problems, and that social scientists have a very important role to play in this regard. It is pointed out that conservation is essential in lessening U.S. dependence on nonrenewable energy resources, more so than renewable energy technologies in the near future at least. Studies have shown that the success of technological energy conservation solutions depends in great part on consumers' attitudes and behaviour.

The author suggests that the Experimental Social Innovation Research model provides an appropriate orientation and framework for empirical social science research on energy conservation. This model entails the definition of a pressing practical problem, the design of innovative solutions, the implementation of innovative solutions in the context of a longitudinal, completely randomized field experiment, and the dissemination of proven solutions.

Potential research is divided into microscopic research, which includes problems relating to the actions, attitudes, values or perceptions of individuals. Macroscopic energy research investigates problems that manifest themselves at the social-systems level of analysis; these include communities, institutions, organizations and groups of people.

7265

Shippee, Glenn, and W. Larry Gregory
1982 Community Commitment, Incentives and Energy Conservation. American Journal of Community Psychology, 10, 1, 81-93.

Objective: To evaluate comparatively the effectiveness of two community intervention strategies designed to enhance energy conservation

Method: Twenty-three small retail firms in Jackson, Michigan, participated. Firms were provided with energy conservation tips, and underwent an audit of the premises. Actual electricity and natural gas consumption data were obtained for the year prior to the experiment, the two-month treatment period and for the two months after the experiment. Firms were assigned to one of three treatments: control, incentive and community commitment. Advertisements that were geared to the treatments appeared in the local newspaper twice a month for two months. Firms completed a questionnaire following the experiment. For various reasons, seven firms were excluded from the data analysis.

Variables: Dependent: actual consumption of electricity and natural gas, self-reported conservation behaviour

Independent: treatment: (1) incentive: the ads named the firms and gave details of the program, "thanking" firms for their efforts; (2) community commitment: same as (1) except actual energy savings were given in the ads; (3) control: firms not mentioned in the ads

Findings/implications: Incentive firms used significantly less natural gas than did community commitment firms, which in turn used less than those in the control group. There were no significant differences between conditions in terms of electricity usage. This may be because owners were reluctant to reduce display lighting, an action which might have adversely affected sales. Lowering thermostats presumably would not have such an effect. Community commitment firms were more likely to estimate that they had saved greater amounts of electricity and natural gas than were incentive condition owners.

7270

Shippee, Glenn
1980 Energy Consumption and Conservation Analysis: A Review and Conceptual Analysis.
Environmental Management, 4, 4, 297-314.

Abstract: This paper reviews and updates the literature from each of three approaches to the psychology of energy consumption and conservation: (1) survey methodology, (2) field-applied, (3) laboratory. Survey research has found that the perceived impact of an energy crisis on an individual and his family is a good predictor of behavioural intentions and levels of compliance with conservation policies. The individual's willingness to accept personal responsibility for energy mismanagement is perhaps even a better predictor. Researchers have had little success in determining if a relationship exists between attitudes about energy and actual consumption patterns. In field research, the interventions receiving the most attention have been information and appeals, consumption feedback and incentives. Information itself has been ineffective in reducing energy consumption, but "prompts" have been somewhat more effective, more so when highly specific. Feedback has been heavily researched, but it remains unclear what types of feedback or information lead to optimal reductions in consumption. Results suggest that feedback will induce reductions in energy use only when it is presented continuously with specific efforts to conserve energy. Individual incentives seem to be one of the most effective procedures for producing conservation (vs. feedback or information). However, most incentive programs investigated have not been cost-effective.

7275

Slovic, Paul, Sarah Lichtenstein, and Baruch Fischhoff
1979 Images of Disaster: Perception and Acceptance of Risks from Nuclear Power.
In Goodman and Rowe, eds., Energy Risk Management. London: Academic Press.

Objective: To describe and discuss attitudes, perceptions and expectations of some members of the anitnuclear public

Method: Data analyzed were gathered in studies of two populations: students at the University of Oregon, and members of the League of Women Voters.

Variables: Perceived risk of dying as a consequence of nuclear power (and 29 other activities); perceived benefits of various activities; rated risk characteristics of nuclear power; expected number of deaths from various activities and technologies; estimates of "maximum credible disasters" from commercial aviation and nuclear power

Findings/implications: Many people expect nuclear power to lead to disasters of universal proportions. They expect greater disasters than is regarded reasonable by most technical experts (though both groups agree on aviation disasters). There is thus a gap between the opinions of most technical experts and the views of the public regarding the risks from nuclear power. Since initial impressions tend to structure the way subsequent evidence is interpreted, it may be difficult to reduce this gap. Nuclear power may gain more acceptance with: (a) a long-term safety record, (b) a responsible agency which becomes respected and trusted, and (c) a clearer appreciation of its benefits.

7280

Solomon, Paul J., and William R. George
1976 An Empirical Investigation of the Effect of the Energy Crisis on Tourism.
Journal of Travel Research, 14, 3, 9-13.

Objectives: To investigate the effect of the energy crisis on the tourism industry. More specifically the study examines the attitudinal and behavioural differences of those who travelled during the energy crisis of February 21 to March 7, 1974, and those who travelled after this period.

Method: A survey was conducted of 383 out-of-state pleasure travellers in Virginia (162 usable responses) during and after the energy crisis of February 21 to March 7, 1974. An analysis was made of the usable responses through the chi-square test of the independence of categorical variables.

Variables: Dependent: travelling during the energy crisis

Independent: age, sex, marital status, education and income of traveller; vacation length

Findings/implications: A significant difference was found on several dimensions between those travelling during the energy crisis and those after the crisis. People travelling during the crisis tended to be older (i.e., were between 54 and 64 years old). This group of "during crisis" travellers were also likely to have middle incomes ($10,000 to $15,000), to be on a long trip (1,000 miles or more), to be on a vacation of two weeks or more and were more likely than "after crisis" travellers to experience perceived inconvenience due to reschedulings and situation modifications.

7285

Sorrenti, K., and Terry Petherick
1980 Canadian Passenger Car Fuel Consumption Survey. In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 147-151.

Objective: To establish a national data base concerning personal use of the passenger car in Canada

Method: A combination telephone interview (for screening purposes) and mail survey was used. Respondents maintained a fuel purchase diary for their vehicle and also completed a usage questionnaire (month period). Data for July-September 1979 were analyzed.

Variables: Distance travelled, fuel consumed, expenditures on fuel

Findings/implications: The bulk of the report describes the sampling procedures and techniques, and data collection methods. Very little evaluation of the results is presented.

7290

Spencer, Robert H.

1981 Policy Applications for Utility Residential Consumer Surveys. In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 23-31.

Abstract: This paper reviews many of the advantages associated with utility data collection programs, based on the author's experience with Seattle City Light (SCL) and Puget Sound Power and Light. Utility billing records provide a source for sampling and related analytical purposes. The SCL program was designed to develop a data base which could be used to investigate a broad range of issues. Analyses were performed to identify unique features in the SCL service area and to reveal special consumption and appliance acquisition patterns. They revealed some anomalies with respect to appliance saturation and to electrically heated structures. Data bases compiled by utilities can be utilized to investigate relationships and phenomena to a greater extent than is being done at the current time.

7292

Stern, Paul C., J. Stanley Black, and Julie T. Elworth
1981 Home Energy Conservation: Programs and Strategies for the 1980s.
The Institute for Consumer Policy Research, Consumers Union Foundation.

Abstract: This book discusses a variety of home energy conservation programs conducted by grass roots organizations, government agencies, utilities and others. The programs are described in some detail and their effectiveness is analyzed.

Information about a wide range of residential energy conservation programs is combined with very detailed information about consumer responses to a program in the northeast United States. To prepare the book, the authors studied 22 energy conservation programs around the country. Although these are only a small fraction of all such programs, they cover the range of types now in operation. Some of the programs have energy efficiency as their primary goal, while others see energy conservation as a means to a goal they consider more important, such as jobs for the unemployed, heat for people suffering in the cold, community control of essential resources, adequate housing and so on. Some of the programs have received substantial support from government or industry, while others rely mainly on volunteer labour and reclaimed materials. Some are organized carefully from the top, while others come from the grass roots. Some are directed at homeowners, others at rental housing. Some have government sponsors, while others are run by community groups, utilities, electric cooperatives or by private entrepreneurs. They serve communities ranging in size from hundreds to millions of people. The programs serve many populations and geographic areas — urban and rural, young and old, snowbelt and sunbelt, black, white and Hispanic.

By analyzing these programs from a consumer perspective, one can identify the critical factors that influence their success and the promising features some programs have to offer. The authors identify a number of potentially important ways energy conservation programs differ from each other in their goals, structures, methods and the contexts in which they operate. The specific programs analyzed can be grouped into Grass Roots Programs, Public Sector Programs, Utility Programs and Miscellaneous Programs.

Stern, Paul C., J. Stanley Black, and Julie T. Elworth (cont.)

Grass Roots Programs investigated include:

1. BANANA KELLY COMMUNITY IMPROVEMENT ASSOCIATION, New York, N.Y.
2. BOILER AND BURNER TRAINING PROGRAM, New York, N.Y.
3. FEDERATION OF SOUTHERN COOPERATIVES, Epes, Ala.
4. MASSACHUSETTS FAIR SHARE, Boston, Mass.
5. NATIONAL BLACK VETERANS ORGANIZATION, Washington, D.C.
6. PEMBROKE SOLAR PROJECT, Hopkins Park, Ill.
7. PEOPLE'S ALTERNATIVE ENERGY SERVICES, San Luis, Colo.
8. WHITEAKER ENERGY INCORPORATED, Eugene, Oreg.

Public Sector Programs investigated include:

1. FERRY VILLAGE NEIGHBORHOOD HOUSING SERVICES, South Portland, Maine.
2. FITCHBURG ACTION TO CONSERVE ENERGY, Fitchburg, Mass.
3. FRESNO COUNTY ECONOMIC OPPORTUNITIES COMMISSION, Fresno, Calif.
4. PHILADELPHIA HOME WEATHERIZATION PROGRAM, Philadelphia, Pa.
5. SEATTLE CITY LIGHT, Seattle, Wash.

Utility Programs investigated include:

1. LONG ISLAND LIGHTING COMPANY, Mineola, N.Y.
2. NORTH ARKANSAS ELECTRIC COOPERATIVE, Salem, Ark.
3. PACIFIC POWER AND LIGHT COMPANY WEATHERIZATION PROGRAM, Portland, Oreg.
4. TENNESSEE VALLEY AUTHORITY, Chattanooga, Tenn.
5. VALLEY RURAL ELECTRIC COOPERATIVE, Huntingdon, Pa.
6. WISCONSIN POWER AND LIGHT COMPANY, Madison, Wis.

Miscellaneous Programs investigated include:

1. ENERGY SERVICE COMPANIES, Energy Productivity Center, Mellon Institute, Arlington, Va.
2. NEW MEXICO SOLAR ENERGY INSTITUTE, Las Cruces, N.Mex.
3. NORTHEAST PACKAGE PROGRAM (address confidential)

The authors make several conclusions.

1. More than one type of program should be available to consumers in any area because consumers vary in terms of their needs and responses to programs.

2. Consumer confidence is possibly the single most important ingredient of success in a residential energy conservation program.

Stern, Paul C., J. Stanley Black, and Julie T. Elworth (cont.)

3. Special efforts are required to inform all potential clients of a home energy conservation program.

4. Accurate information and attractive financing arrangements are not enough to get energy efficiency into most homes.

5. The evaluation of home energy conservation programs must be given much more serious attention.

7295

Stern, Paul C., and Gerald T. Gardner
1981 Psychological Research and Energy Policy.
American Psychologist, 36, 4, 329-342.

Abstract: This paper briefly reviews research aimed at understanding the human implications of energy problems, and suggests opportunities for psychologists to make additional contributions to energy policy. Behavioural research has considered four independent variables: (1) information on ways to conserve energy (effective only as part of a larger program); (2) prompts (need for specificity); (3) monetary incentives; and (4) feedback (frequent feedback usually produces short-term energy savings). Social-psychological research has applied knowledge of attitudinal processes, social influence and group functioning to energy conservation. The most noteworthy progress has been in the work on feedback systems for conservation, and on developing policies for conservation in master-metered multiple residences. Psychology's effort should begin with a behaviourally oriented analysis of the national energy system, identifying the extent of potential energy savings possible with each type of decision maker, end use and decision type. There are distinctions to be made between behaviours modifying the use of existing energy systems (curtailment) and those adopting more energy-efficient technologies (efficiency), and also between frequently repeated decisions and one-time or infrequent decisions. Household energy consumption accounts for 32% of national energy use, and transportation accounts for 47% of household use. The greatest potential for conservation in the household sector is in efficiency behaviour, chiefly in the form of automobile purchases and insulating homes. The nonhousehold sector has been largely ignored by psychological researchers. Psychologists can also investigate other areas of energy policy, such as the effects of different energy production and distribution systems, and the provision of input to policymakers. In the long term, psychologists can look at the changes that will take place in social systems and individual lifestyles as new energy systems are adopted.

7300

Stern, Paul C., and Gerald T. Gardner
1980 A Review and Critique of Energy Research in Psychology. Social Science Energy Review, 3, 1, 1-62.

Abstract: The behavioural approaches to research have centred on: (a) information and prompts: "how-to-save" information may be effective only as a part of a larger conservation program, while specific prompts are probably more effective than general exhortations; (b) incentives: studies have not demonstrated strong immediate effects in relation to program costs; and (c) feedback: frequent feedback produces short-term energy savings at 10% to 20% of previous use (maybe more). The "commons dilemma" framework gives reason to be skeptical about incentive approaches. It suggests energy use may be more controllable by strengthening group ties when groups are relatively small and when they manage their own energy resources. Psychological research has been atheoretical, proceeding in a crisis atmosphere without careful analysis of the behaviours to be changed. Another shortcoming has been the difficulty of showing that the research can be relevant to the interests of policymakers. Neglected areas of research include: (1) adoption of energy-efficient technology (one-time) behaviours, which have more potential for conservation than the curtailment behaviours which have been examined; (2) household transportation, including topics such as van/carpools, mpg feedback devices and purchase decisions re fuel-efficient vehicles; and (3) nonhousehold energy consumption, including commercial buildings, small businesses, etc. Psychology can contribute as well to policy decisions about energy supply and fuel switching. Applied roles for psychologists include: (1) identifying and implementing direct social strategies; (2) enhancing market penetration of new technologies; (3) predicting and analyzing social impacts of programs; and (4) field evaluation of program effectiveness. Some issues that have relevance to energy policy include: (1) social traps and the "tragedy of the commons," (2) social responses to scarcity, (3) public response to perceived risk, (4) diffusion of innovations, (5) consumer purchase decisions, (6) policy-oriented decision making, and (7) changes in cultural values.

7305

Sterngold, Arthur, and Philip Kotler
1979 A Marketing Approach to Energy Conservation.
In Karl Henion and Thomas Kinnear, eds., The Conserver Society. American Marketing Association.

Abstract: The purpose of the paper is to discuss ways in which marketing concepts can contribute to the cause of voluntary energy conservation. Several approaches could be used to promote energy conservation: (1) legal-regulatory: enforcing new laws and regulations: (2) technological: primarily in terms of solar and nuclear; (3) economic: subsidies, taxes and price controls; (4) public information: provide people with the information, and they make the effort to conserve; and (5) community: working together in communities to solve energy problems. The social marketing approach may be superior to these others. People's attitudes and behaviour regarding energy conservation are significantly influenced by factors other than money, such as comfort, convenience, time, effort, "bother," etc. This must be considered when marketing energy conservation. Market segmentation or the use of different approaches to reach different subgroups must be considered (e.g., owners vs. renters). A series of recommendations for marketing energy conservation is offered. They are categorized into five groups: (1) product and program design, (2) place, (3) price, (4) promotion and publicity, and (5) personal communications. Social marketing aims at eliciting voluntary behaviour based on the self-interest of consumers by paying close attention to their needs, attitudes and other characteristics.

7310

Stuntz, Mayo S., and Eric Hirst
1976 Energy Conservation Potential of Urban Public Transit. Transportation Research Record No. 599, Transportation Research Board, National Academy of Sciences, Washington, D.C., pp. 46-51.

Abstract: This paper reviews urban travel in the years 1950-73 as it relates to energy efficiencies of the automobile and transit services. The potential of expanded and improved transit service is evaluated, along with recommendations for policy action. Recent events like the Arab oil embargo and higher gasoline prices have made the future role of urban public transit an important but uncertain one in the United States. Since 1972 the trend away from public transit use has stopped and perhaps even begun to reverse itself. But the automobile still dominates the fuel-use budget, using 60% of the total, while urban transit is responsible for only 0.5% of the fuel use. There have been several reasons for this long-term trend away from transit: declining real prices for fuel and automobiles, increasing transit fares and personal incomes, changing land-use patterns and federal support for highway construction. But the fact remains that buses are half as energy intensive as are cars, and bus system efficiency improves with increasing city size.

The short-term contribution of transit to energy conservation is limited because it carries such a small percentage of urban passenger travellers to begin with. Transit fare reductions and service improvements are seen to have negligible energy-savings impacts, unless the increased ridership comes largely from car drivers (which is not always the case). Several transit incentives and automobile disincentives are suggested to influence people to travel by transit rather than by car. But the expected limited contribution of transit in the next decade (due to lags associated with changing land-use patterns), attitudes and auto ownership should not deter policymakers from starting now so that long-term benefits can be realized.

7605

Tait, Alan A., and David R. Morgan
1980 Energy and the Role of Gasoline Taxation.
Finance and Development, June, 7-11.

Abstract: The authors use the results of an earlier study of gasoline taxation in seven Organization for Economic Cooperation and Development (OECD) countries to discuss some misconceptions about the effects of increasing taxes on gasoline sales. The tentative conclusion reached in this paper is that the importance of gasoline taxes is often exaggerated, and excessive stress has been placed on the macroeconomic implications of an essentially microeconomic issue. Traditionally, gasoline taxes were levied to meet road construction and maintenance costs, but following the OPEC oil embargo of 1973 gasoline taxes became an instrument of reducing dependence on imported oil. The paper indicates, however, that although the real price of crude oil doubled between 1970 and 1978, this was not reflected in retail gasoline prices in most OECD countries. This modest increase in real gasoline prices was, in great part, attributable to the countries not adjusting gasoline taxes upward sufficiently to match the general rising price level. Defences for this policy included not wanting to contribute further to inflation, distribution of income problems, and balance of payment problems.

7610

Tankersley, Clint B.
1977 Concern Toward the Energy Crisis: Some Social-Psychological Correlates.
In J.D. Stolen and J.J. Conway, eds., Proceedings of the 9th Annual Meeting of the American Institute of Decision Sciences.

Objective: To test how social-psychological factors relate to attitudes and perceptions of the energy crisis

Method: Questionnaires were administered to 160 subjects in a mid-sized eastern U.S. city. An overall attitude towards the energy crisis was obtained by summing scores for 11 energy-related questions. Respondents were divided into three groups: concerned, neutral and unconcerned.

Variables: Dependent: inner-other-directedness, interpersonal orientation (compliance), authoritarianism

Independent: group membership (energy attitude)

Findings/implications: Other-directed individuals tend to be more concerned over the energy crisis than inner-directed people. This may be because they do not want to be cast as an energy waster. Unconcerned subjects were also non-detached and authoritarian. Research in this area can be used to direct campaigns which are aimed at increasing concern over the energy crisis, on the assumption that increased concern will be translated into an increased incidence of energy conservation behaviour.

7615

Thomas, Kerry, et al.
1979 A Comparative Study of Public Beliefs about Five Energy Systems.
Working paper, International Institute for Applied Systems Analysis, Laxenburg, Austria.

Objective: To further the understanding of belief systems to help policymakers gauge public acceptance of their policies

Method: In Austria, 224 usable interviews were completed. Attitudes of the 50 respondents most favourable to the use of nuclear energy (PRO) were compared to those of the 50 most negative (CON). Differences in attitude were examined by analysis of variance (ANOVA).

Variables: Dependent: attitudes towards the use of coal, oil, hydro, solar and nuclear; PRO/CON

Independent: beliefs about future and political risks (of the five sources), economic benefits, environmental risks, psychological/physical risks, future technology development

Findings/implications: For hydro and solar there were virtually no negative attitudes; the most frequent response was highly favourable. For coal and oil, most respondents were moderately favourable, with few being either highly negative or positive. For nuclear, there were clusters of highly negative and highly positive attitudes. PRO nuclears were more favourable towards the nonnuclear sources than the CON nuclears. PROs were significantly more favourable towards oil. CON members believed nuclear would lead to all three types of risk (see above), while PRO members did not think it would lead to future, or to a lesser extent environmental, risks. CONs did not see hydro or coal leading to the economic benefits foreseen by the PROs. The PRO group members felt nuclear would be the source most likely to lead to economic benefits and technological developments; they saw fossil fuels as having appreciable environmental risks. CONs felt that nuclear was only marginally more likely to provide benefits than fossil fuels.

8005

Ugolick, Wayne R., and Patrick J. Sileo
1980 Travel Behavior Changes in an Energy Crisis: Some Empirical Findings and a Proposed Model.
Preliminary research report for the Planning Research Unit, New York State Department of Transportation, Albany.

Objectives: To determine the possible conservation actions which people might take in response to supply restrictions and increased gasoline prices; more specifically, to test the hypotheses that people take certain "types" of actions consistent with their individual "Level of Mobility," and that possible future actions will be built on the types of actions already taken

Method: A survey of 1,520 New York State households was conducted in the fall of 1979. Respondents were asked to indicate the energy conservation measures that they had already undertaken, and those that they might undertake in response to a shortage or an increase in price.

Variables: Dependent: shopping-related energy conservation actions, recreation-related energy conservation actions, work-related energy conservation actions

Independent: a hypothetical increase in the price of gasoline by $1.50/gal., a 20% shortfall in gasoline supply

Findings/implications: If gasoline shortages occur, people would generally take fewer shopping-related energy conservation actions and more recreational, work and general energy conservation actions than if prices rose alone. The study tends to show that people would respond to restrictions on gasoline use in a similar manner to the way in which they have thus far responded to the "energy crisis." People generally perceive shortages in supply as requiring more "serious" action than increases in gasoline price.

8010

Umble, M. Michael, and Rodney Carlson
1978 The Effect of Gasoline Price and Availability on Automobile Market Shares.
In R.J. Ebert et al., eds., Proceedings of the 10th Annual Meeting of the American Institute for Decision Sciences.

Objective: To analyze the effect that future changes in the domestic energy situation might have on consumer purchase decisions in the automobile market

Method: Telephone interviews were conducted with 157 residents of Athens, Georgia.

Variables: Dependent: purchases under four scenarios: (1) current economic conditions; (2) gasoline price, $1.00/gal.; (3) gasoline rationing, 10 gals./wk.; (4) gasoline stations closed on weekends

Independent: previous purchase decision(s)

A "conditional" Markov analysis is employed to investigate the dynamic implications of changing consumer preferences for automobiles.

Findings/implications: The number of owners in each class were: subcompact, 30; compact, 34; intermediate, 48; full-size, 35; and luxury, 10. Scenarios 2, 3 and 4 produce large increases in the market share of subcompact cars (60%, 63% and 43% respectively, vs. 15% in Case 1). Gasoline rationing produces the largest movement to down-sized automobiles. Case 4, closing of gasoline stations on weekends, has the least effect. Governments should study various policy alternatives and determine which would most effectively bring about desired changes in consumer automobile purchase decisions.

8015

U.S. Department of Energy
1980 Electric and Gas Utility Marketing of Residential Energy Conservation.
Prepared by Booz-Allen & Hamilton, Inc.

Abstract: This report, using information provided by nine utilities which have marketed their conservation programs, and focusing on the home energy audit, is designed to assist utilities in promoting their audit programs. The first element in a good marketing strategy concerns promotion, which should create awareness and interest in the program. The following specific recommendations are made: (1) media message: emphasize saving money through conservation -- do not stress lifestyle changes, sacrifice or the national interest; (2) media type: newspapers are less costly and reach a wide audience -- the effectiveness of bill inserts varies, although this technique can be used to target certain groups; (3) advertising timing: advertising should precede the high-energy usage season. In terms of the audit itself, there are several recommendations. (1) Keep track of all inquiries for information. (2) Keep the time span between audit requests and audit performance as short as possible, as delays increase the likelihood that customers will forget or will not want the audit. (3) The auditor must establish a rapport with the customer, as selling the recommended measures is as important as performing a technically competent audit. (4) The most effective type of audit is an on-site audit; it is important to present audit results to customers in person, so the customer understands the results. Key findings from consumer research on energy conservation indicate that: (1) people conserve energy to save money (not for "the national interest"); (2) the high perceived costs of measures discourage their implementation; (3) people are reluctant to make lifestyle changes; (4) people do not generally understand which measures are effective or cost-effective, or have much knowledge about thermal efficiencies; (5) advertising programs elicit a high degree of customer awareness; (6) those least receptive to conservation include homeowners who have already made conservation investments, persons on fixed or low incomes, and renters; (7) those most receptive include high-energy users and owners of older homes; (8) customers are generally satisfied with audits and are acting on some of the recommended measures.

8020

U.S. Department of Energy

1980 Encouraging Energy Conservation in Multifamily Housing: RUBS and Other Methods of Allocating Energy Costs to Residents. Volume I: Background, Methods, Results. Volume II: Materials for Property Owners and Managers.
Prepared by the Institute of Behavioral Science, University of Colorado.

Objectives: (1) To evaluate methods of promoting energy conservation in master-metered rental housing; (2) to evaluate the Resident Utility Billing System (RUBS) in depth; and (3) to prepare a guide outlining the use of RUBS (Vol. II)

Method: Fourteen properties in Dallas, Charlotte (North Carolina), Denver and Atlanta using RUBS were evaluated on a before and after conversion to RUBS basis. Some feedback from residents on their reaction to RUBS was gathered.

Variables: RUBS allocates monthly energy costs to residents according to the number of square feet occupied.

Findings/implications: Savings ranged from 1% to 23% and were statistically significant for 22 of 28 comparisons. Savings for the second and subsequent years were larger than those for the first. Savings size was unrelated to the number of units or per-month utility cost. Electricity demand (maximum power drawn at any one time during the month) was also reduced in 13 of 14 comparisons (2%-19%), for four all-electric and three electrically cooled properties. The savings were lower than those associated with individual metering (so, too, were the costs). For cooling, RUBS accounted for savings of 8% (range 5%-15%) vs. 22% for individual metering (range 10%-35%). For heating, estimated savings are the same (5%), but theory and European data suggest that savings from RUBS will be lower. Some residents did not like the lack of individual control and feedback regarding energy costs, preferring individual metering. There were some suspicions that management was overcharging and that poor maintenance was contributing to excess energy costs. Indicators were that leasing, occupancy and turnover rates remained essentially unchanged with RUBS. Some problems were encountered at some properties, mostly because of poorly planned conversions. Property managers with extensive RUBS experience all reported that RUBS was cost-effective for them. Potential abuses of RUBS (neglected energy efficiency, lease violation, misleading cost information, unwarranted charges, misuse of collections, misleading publicity) are outlined, as are approaches to preventing abuse. Factors limiting the

U.S. Department of Energy (cont.)

widespread use of RUBS are also discussed. Included are legal regulations prohibiting or limiting its use in 17 states. Details of the legal status of RUBS in all 50 states are contained in one appendix.

8405

Van Helden, G. Jan, and Selie S. Weistra
1981 Progressive Rate Structure for Household Electricity. In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 213-223.

Objective: To show how the rate structure can contribute to a policy of energy saving

Method: The analysis used data from an interview study of 292 households in Groninger (Netherlands). As well, results from an econometric study were evaluated.

Variables: Dependent: consumption of electricity, intentions to consume

Independent: four rate structures: proportional rate structure with a constant fixed charge, progressive step tariff with a constant fixed charge for every consumption block, progressive step tariff with degressive fixed charges, progressive block tariff with a constant fixed charge

Findings/implications: The turnover from a proportional to a progressive rate structure causes a decrease in consumption, and as the differences in price between the blocks become larger, the decrease in consumption will be larger. A progressive rate structure will have two side effects. Income will be redistributed from large consumers to small consumers, and revenue neutrality will not be achieved, as total revenue declines. It may be worthwhile to introduce progressive energy taxes on the sum total of energy consumed per household (all forms), in order to decrease total energy consumption. The decrease in consumption achieved with the progressive rate structure varies from 1% to 6%. Experimental studies should be conducted to obtain a more precise understanding of the relation between size of consumption and the price sensitivity.

8410

Verhallen, Theo M., and W. Fred van Raaij
1981 Household Behavior and Energy Use.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 32-45.

Objective: To investigate energy usage-related household behaviour and its impact on energy use

Method: During 1976-77, 145 households in Vlaardigen (Netherlands) were monitored for energy use. Participants were surveyed for data for other variables.

Variables: Dependent: natural gas usage for home heating

Independent: energy-related attitudes; sociodemographics; home characteristics (insulation, wind orientation, position re neighbouring homes); household behaviours (airing bedrooms, adjusting thermostat settings, etc.); special circumstances (absences during day/weekend, guests, changes in family composition)

Findings/implications: Three energy attitudes emerged as important: energy consciousness, home comfort and price consciousness. The following six behaviours did as well: bedroom temperature while sleeping, home temperatures during absence from home, home temperature while at home, use of curtains, airing rooms and use of bedrooms. Attitude-behaviour relationships were mainly insignificant (attitudes predict behaviour up to 5%). Household behaviour variables explained 25% of the variation in natural gas use. Home characteristics explained 24% of the variation (insulation and home attachment were major factors). Campaigns aimed at changing behaviour by changing attitudes may be ineffective. Prescribed home improvements, coupled with behavioural recommendations, may offer more potential for energy savings. Consumers may act according to their attitudes when they feel personally responsible for energy problems and perceive that their personal contribution to energy saving is effective.

8805

Wakeley, Harold

1980 Predicting Consumer Response to Gasoline Shortage. Prepared for Transportation Research Board, National Energy Users Conference, San Antonio, Tex.

Abstract: Utility theory has not proven to be the ultimate in predicting market behaviour. Subjective decisions in favour of a particular mode of transport, for instance, are only partially founded on a rational evaluation of objectives, or economic parameters. Influences of recency and emotional saliency exert effects upon perceived probability out of all proportion to their statistical probability. Consumers may thus believe that the probability of a gasoline shortage occurring is small in part because they have had few experiences of the kind. Reactance theory predicts that an individual will be motivationally aroused to reestablish a freedom whenever that freedom is eliminated or threatened with elimination. Response to availability of gasoline is affected by the expectation that the individual possesses control over the gasoline source to begin with, the strength of the threat to his access of gasoline, the importance of access to gasoline, and the implications of this threat for his other freedoms. Learned helplessness theory suggests that if there is certainty about an outcome (e.g., shortage) and the individual does not have prior expectations about a different outcome, conditions will be accepted. If conditions are perceived as uniform for all other individuals, acceptance will be further enhanced. In the event of a shortage, information must be provided which can be reliably and rapidly interpreted and used as a basis for deciding on courses of action, so that all individuals respond in an acceptable manner which will not exacerbate conditions. The information must not imply that the situation is catastrophic or enduring, must not dwell on undesired alternative behaviours and must not allow for the formulation of independent courses of action.

8810

Walker, James M.
1980 Voluntary Response to Energy Conservation Appeals. Journal of Consumer Research, 7, 1, 88-91.

Objective: To present evidence supporting the hypothesis that household reduction in energy use following the Arab oil embargo was greater than that which can be explained by changes in market price or real income

Method: Electricity usage for the 129 members in the experimental group was compared to that for the control group (N = 179) for 1972-73 and 1973-74. The experimental group received its treatment as part of other related experiments.

Variables: Dependent: electricity consumption

Independent: treatment

Findings/implications: There were no differences in average use of electricity between the two groups for the summers of 1972 and 1973. From summer 1973 to summer 1974 the experimental households reduced consumption approximately 7% relative to the control group. The difference appears to be primarily due to the differential response to the oil embargo. The extent of this response depends upon many factors, including the type of energy use and the subset of the population under study.

8815

Warkov, Seymour

1981 Adopting Solar and Conservation.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 123-129.

Objective: To examine certain relationships between residential energy conservation behaviour and adoption of solar heaters

Method: A random sample was taken of 215 households which had applied for a grant under a Connecticut program promoting solar hot water systems. Interviews were completed with 82% of those households during the spring of 1979. Six months later, telephone contact was made with 102 of the 121 households identified as solar nonadopters in the earlier survey.

Variables: Dependent: solar adoption (yes/no), intentions to adopt solar, reasons for nonadoption, responsiveness to solar incentives

Independent: encouragement to purchase solar; physical characteristics of roof; attitude re private benefits of solar; attitudes re savings associated with solar; attitudes re advantages associated with energy independence; attitudes re global depletion of fossil fuels; energy-conserving behaviour (within last five years, and ever); reliability of energy conservation information sources

Findings/implications: Households were more likely to adopt the solar technology when they encountered a supportive social environment, perceived only secondary economic benefits to be associated with solar, resided in housing displaying the appropriate setting and building configuration, and attributed a serious energy shortage to declining world fossil fuel supplies. Major barriers to solar adoption are economic (price, payback) and benefits gained by spending the same amount on conventional measures. Attributions of reliability to various sources of energy conservation behaviour are inconsequential for understanding residential behaviour designed to reduce energy consumption. Perceptions of the benefits linked to conventional conservation, not the conservation behaviour itself, accounts for the readiness of nonadopters to withdraw from the solar market. Those who are interested in but unwilling to adopt solar technology should be encouraged to take extensive conventional conservation action. The role of social networks in mobilizing household resources on behalf of energy conservation should be further investigated. Conservation decisions may be responsive to fear appeals.

8820

Warriner, G. Keith
1981 Electricity Consumption by the Elderly.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perspectives on Research and Policy Options. New York: Praeger Publishers, pp. 69-80.

Objective: To examine electricity consumption by the elderly

Method: A four-year panel study was conducted in 1976-80 in northern Wisconsin. Electrical consumption was monitored for 700 homes (every 15 minutes). Subjects were not aware that consumption was being monitored. From a mail questionnaire administered to the homes in March 1977, 664 usable responses were obtained. Only returns from nonelectrically heated homes were analyzed (N = 606).

Variables: Dependent: monthly level of consumption, average monthly bill

Independent: elderly vs. nonelderly; proportion of electrical consumption necessary for basic needs; income; home size; appliance saturation; rural vs. nonrural; education

Findings/implications: The elderly use less electricity, spend more of their income on electricity and use a greater proportion of electricity for essential needs. Homes containing elderly adults tend to be smaller, have fewer household members, lower incomes and fewer appliances. Regression analysis shows that smaller homes, fewer people and fewer appliances are more important determinants of lower consumption than is lower income. Income has considerable indirect effects through its associations with home size and appliance stock. Income accounts for only 29% and 14% of the variance in those two variables respectively, so there is a considerable amount of variance not accounted for by income. The elderly may be in a less disadvantageous position re the energy crisis than is generally assumed. That is not to say they do not face disadvantages. The inequities that do exist might be overcome through direct payments or energy credits. Any contemplated program should be carefully assessed as to its effects prior to implementation.

8825

Wartick, Steven L.
1980 Employer-Organized Vanpooling: A Program for the 1980s. Business Horizons, 23, 6, 48-56.

Abstract: This article investigates the advantages and disadvantages of vanpooling from both the employer and employee point of view. To do so, it looks at the vanpooling programs at a Kansas City corporation. The program, begun in May 1979, involves eight vans and 102 (of 275) employees. Cost advantages for vanpool participants are demonstrated. Other advantages include comfort, relaxation and social interaction. Companies which have organized vanpools (Gulf, 3M, Chrysler) report general satisfaction with their programs. Employees report decreased automobile insurance premiums and less need for a second family car. Employers save money on parking lot construction and taxation, and enjoy increased employee morale. Possible future incentives for vanpooling include priority gasoline availability, a reduction in toll costs for vanpools, and a reduction in or elimination of offstreet parking in areas where vanpools are used.

8830

Waverman, L.
1977 Estimating the Demand for Energy: Heat Without Light. Energy Policy, March 2-11.

Abstract: The author reminds readers that the demand for energy is a derived demand, and as such, it is necessary when measuring consumption of energy to measure it in terms of output BTUs, which represent the energy available after conversion to the use to which it is to be put. The author then goes on to analyze several papers which attempt to estimate the exact causal relationship between energy demand and several determining factors. The author points out the numerous difficulties in this kind of study, including the extreme difficulty of getting reliable data, the lack of "perfect theoretical models" and the nature of feedback mechanisms. He also raises the issue of the validity of using 1969 behavioural determinants as the basis for solutions to present-day problems.

8835

Webber, Robert E.
1979 Program Evaluation of the Tennessee Energy Authority -- Energy Extension Service [TEA-EES].
Energy, Environment, and Resources Center, University of Tennessee, Knoxville.

Objectives: To describe the organizational background, program objectives and activity documentation of the TEA-EES, and to evaluate program results

Method: The TEA-EES pilot program was originally designed to run from October 1977 to March 1979 but was continued through September 1979. Five major target audiences were defined: urban residents, rural residents, small businesses and industries, city and country governmental institutions, and mortgage, loan and realty groups. Program components included an energy hotline; individual client contacts; group contacts, through workshops/seminars and group meetings; energy audits; and surveys of savings and loan companies and business and industry members. Group meetings were largely home weatherization courses (373 meetings were held). Energy audits were performed free for urban residents (55), small businesses and industries (96), and city institutions/buildings (518). The savings and loan survey was administered once, with 55 of 150 respondents returning completed questionnaires. The industry survey was done in three stages, with three separate samples of 258. Returns were 77, 55 and 55.

Variables: Seminars: evaluations of meetings, actions taken during subsequent year (found by telephone survey), change in electricity consumption during subsequent year;
audits: actions subsequently taken (telephone survey);
savings and loan survey: attitudes and behaviours towards underwriting home loans involving energy-conserving features;
business and industry survey: energy conservation activities undertaken

Findings/implications: Approximately 5,300 significant individual contacts were made (requests for information, inquiries about specific program components). Participants in group meetings gave them very positive ratings. One year later 92% reported having weatherized their home in some way. In addition, they reduced electricity consumption by 5.8% over the same time period. Savings realized from energy audits exceeded costs by 4:1 for city institutions and by 3:1 for businesses and industries. Savings and loan companies generally reported a lack of knowledge with respect to relatively new energy-saving techniques.

Webber, Robert E. (cont.)

Business and industrial firms made moderate efforts to conserve and were very interested in learning about ways to conserve. Projects cannot be expected to produce immediate results, and thus evaluation should not be restricted to only the first few months. Program planning should focus on local needs and resources to provide energy information and assistance responsive to the target audiences' situational demands.

8840

Wehrung, Donald A.

1980 Space Heating in the Residential Sector: Household Thermal Efficiency and the Need for Upgrading.
Faculty of Commerce and Business Administration, University of British Columbia, Vancouver.

Objective: To present a descriptive model of the homeowner's decision to upgrade the thermal efficiency of his home

Method: Data were gathered as part of a larger study.

Variables: Dependent: levels of insulation, heating bills, thermostat settings

Independent: heating degree days, panel vs. ENER$AVE (government insulation information program) voluntary user, energy knowledge and conservation activities, home characteristics

Findings/implications: The ENER$AVE program is being used by homeowners whose homes have less insulation and higher fuel bills than the average household. Their homes are generally older, multiple-storied, and more apt to have oil as their principal heating fuel. There is some information to suggest that homeowners are doing certain actions above recommended levels (e.g., weatherstripping). Respondents consistently attributed less energy savings to the various conservation activities than was actually the case. A claimed awareness of "R" values was highly correlated with higher insulation levels. Increased attention to educating the public about basic facts on energy may lead to home retrofitting. A study of Canadians' awareness of and participation in the ENER$AVE program would be useful. Further understanding of the homeowner's decision to upgrade the thermal efficiency of his home would also be helpful to government policymakers.

8845

Wenders, John T., and Lester D. Taylor
1976 Experiments in Seasonal Time-of-Day Pricing of Electricity to Residential Users.
Bell Journal of Economics, 7, 531-552.

Abstract: A number of experiments designed to test the feasibility of time-of-day (TOD) pricing are currently underway. Such experiments must yield the number and composition of customer classes and the number of pricing intervals that it is feasible to initiate. Properly designed experiments require a long time horizon (seven years minimum). Baseline monitoring should be at least 12 months. Realistic prices should be used, as prices set too low will distort consumer choices. A lump-sum payment should be given to encourage participation, so that participants are paying less for electricity than they would be otherwise. A British TOD experiment conducted during 1967-72 involved three types of rates: seasonal, seasonal time of day, and load rate. Load factors were improved, but generally valleys were filled in, rather than peaks being shaved. The net benefits were negative for each of the experiment tariffs, with the TOD loss being the greatest (because of metering costs). The experiment did have some drawbacks, but it suggested that a straight seasonal tariff may be best. There is little doubt that TOD would have benefits when applied to large (industrial) users, but it may not be cost-effective in the household sector due to the costs of metering. TOD rates may be most beneficial in the southern United States, where summer demand is high.

8850

White, Lynn K., and Nikolai Rudakov
1979 Energy: Voluntary Household Conservation in Nebraska. Nebraska Annual Social Indicators Survey, University of Nebraska-Lincoln.

Objective: To provide data on actual compliance to conservation guidelines in home heating and cooling in Nebraska

Method: Data were collected as part of a larger survey. A total of 1,882 in-home interviews were conducted statewide.

Variables: Dependent: conservation behaviour (thermostat settings, use of air conditioners)

Independent: demographics

Findings/implications: Nebraskans set their thermostats higher than recommended by federal agency targets (69°F vs. 65°F during the day). They also kept homes cooler in summer (76°F vs. 78°F). There is little difference between the settings of various subpopulations (the elderly tend to keep the house about 1°F warmer, and the more affluent use air conditioners more). Only 52% reported lowering thermostats since 1973, and 30% had done so in the last year. Changes in air conditioning were less, with more changes being made by higher-income groups. Those who rent their homes/apartments and do not pay their own utility bills were least likely to have made conservation efforts. Nearly 80% of Nebraskans had undertaken a retrofitting behaviour (weatherstripping, storm windows, etc.) in the previous two years. Those with higher incomes and who own their homes (vs. renters) were more likely to have engaged in such behaviours.

8855

Winett, Richard A., et al.
1981 Modifying Perceptions of Comfort and Electricity Used for Heating by Social Learning Strategies: Residential Field Experiments.
Discussion paper for inclusion in ASHRAE Transactions, 87, 1.

Objectives: (1) To ascertain the limits of temperature and humidity to which people can adapt in their homes both in summer and in winter; and (2) to investigate the effectiveness of various methods of motivating people to reduce their energy consumption in the home

Method: The study took place in two all-electric town house apartment complexes in Virginia. Households (N = 83) were assigned to five treatment groups on a stratified random assignment basis based on self-reported thermostat settings. All households participated in a three-week baseline period, followed by a five-week intervention period in which they were assigned to one of five treatment groups, and a final eight-week follow-up phase.

Variables: Dependent: daily electricity meter readings; hygrothermograph readings which biannually displayed the temperature and humidity of the household; male and female clothing checklists on which the participants listed the clothes that they were wearing; a comfort rating; and a health form on which the participants listed colds or illnesses

Independent: combinations of daily written feedback on energy use delivered to a household's door; no feedback; and videotaped "training sessions" on how to adapt to various temperature and humidity changes in the house

Findings/implications: Either alone, or in combination, feedback and the modelling condition were effective in motivating people to reduce overall electricity use by about 15% and electricity used in heating by about 26%. Comfort was generally not affected, clothing was increased and the follow-up data indicated that the reduced energy consumption levels were maintained. The study appears to indicate that people can be comfortable at temperatures far below those indicated in other laboratory-based studies of comfort.

8860

Winett, Richard A., and Michael S. Neale
1979 Psychological Framework for Energy Conservation in Buildings: Strategies, Outcomes, Directions.
Energy and Buildings, 2, 101-116.

Abstract: This paper focuses on the concepts, methods and procedures that social scientists (primarily psychologists) have utilized in energy conservation research. A review of energy conservation research on rebates and feedback strategies is provided. Special emphasis is placed on the literature dealing with master-metering and peak-load management. The authors contend that there is room for -- and indeed a need for -- an expansion of psychologically based energy conservation research. This expansion may encompass macro- as well as micro-level issues.

8865

Winett, Richard A., Michael S. Neale, and H. Cannon Grier
1979 Effects of Self-monitoring and Feedback on Residential Electricity Consumption.
Journal of Applied Social Behavioral Analysis, 12, 2, 173-184.

Objectives: (1) To determine whether residential consumers could be quickly taught to read their electricity meters and reliably and frequently monitor their consumption, (2) to see if a self-monitoring procedure could reduce electricity consumption if residents were also provided with weather correction and conservation information; and (3) to evaluate the effects of the procedure on very high-use residential electric consumers during the winter

Method: The study was conducted in an upper-middle-class neighbourhood of almost identical, all-electric town houses (N = 17) that averaged 170 kW·h per day per household. Twelve households received daily written feedback, 16 were taught to read their outdoor electricity meter and to record daily kW·h use, 14 participated as a comparison group, and 29 only agreed to have their meters read.

Variables: Dependent: household electricity consumption

Independent: written feedback, self-monitored feedback

Findings/implications: During a one-month period in which the procedures were in effect, the feedback group reduced consumption by 13% and the self-monitoring group by about 7%. Self-monitoring participants were highly reliable and persistent meter readers. Energy savings in the study appeared to be primarily attributable to changing the thermostat setting. Self-monitoring is a comparatively easy and inexpensive means of achieving in-home electricity conservation.

8870

Woo, Tae O., and Carl H. Castore
1980 Expectancy-Value and Selective Exposure as Determinants of Attitudes Toward a Nuclear Power Plant.
Journal of Applied Social Psychology, 10, 3, 224-234.

Objective: To attempt to verify a relationship between attitudes towards a nuclear power plant and beliefs held with regard to that plant

Method: A telephone survey (N = 242) was conducted in an area surrounding a proposed nuclear power plan in Indiana. Respondents were divided into three groups: Pro (N = 82), Anti (N = 45) and Undecided (N = 43).

Variables: Dependent: attitude cowards nuclear plant

Independent: awareness of controversy, awareness of arguments for and against the plant, ratings of possible outcomes ascribed to the plant

Findings/implications: About 30% had never heard of the proposed plant. The Pro group perceived distinctly more benefit than the other two groups, and the Anti group perceived more cost. The groups did not differ in terms of the number of potential positive outcomes, but the Anti group did consider more potential negative outcomes. The major difference was the subjective weight assigned to each set of the potential consequences. Disagreement about potential costs may be a reflection of opinions expressed by experts (there is little agreement among them).

9605

Zigmund, William, William Lundstrom, and Donald Sciglimpaglia
1979 Carpoolers, Solo Drivers and Bus Riders: A Demographic Analysis of Transportation Mode Selection.
Proceedings of the American Institute for Decision Sciences, 11th Annual Meeting, New Orleans.

Objective: To examine the characteristics of solo drivers, carpoolers and users of mass transit

Method: Questionnaires were administered to 434 employees of various firms in the central business district (CBD) of Tulsa, Oklahoma.

Variables: Dependent: mode of work travel, motivation behind carpooling

Independent: demographics, distance from work

Findings/implications: Sixty-eight per cent of the employees lived less than 10 miles from the CBD, 70% drove an automobile to work and 14% more "carpooled." Carpoolers tended to be married with working spouses. Bus riders tended to be married with nonworking spouses. Single people are more likely to take the bus, as are lower-income persons and people who have worked only a short time at their present place of employement. Solo drivers are more likely to live less than 5 miles from work, while most carpoolers live in the 5 to 20-mile range. There are higher percentages of bus riders outside 20 miles and inside 5 miles than in the other category. Those arriving at work during rush hour (7:30-8:30) have a higher percentage of solo drivers than expected by chance alone. Motivational factors for carpooling probably vary between cities, making flexibility important in any national program.

9610

Zimmerman, Carol A.
1981 Household Travel Patterns by Life Cycle Stage.
In John D. Claxton, C. Dennis Anderson, J.R. Brent Ritchie, and Gordon H.G. McDougall, eds., Consumers and Energy Conservation: International Perpsectives on Research and Policy Options. New York: Praeger Publishers, pp. 81-95.

Objective: To examine the variation in household travel to determine the magnitude of demand for energy for travel in the United States

Method: Data used were collected in the National Personal Transportation Study (NPTS), which was conducted from April 1977 to March 1978. The sample consisted of 15,579 households.

Variables: Dependent: reported travel behaviour: number of trips, and average miles per day

Independent: demographics (included household's stage in life cycle), life cycle patterns (one of five), purpose of travel

Findings/implications: Most of the analysis presented in the paper focuses on families in the "typical" life cycle. Stages in the life cycle appear to influence the demand for travel: travel increases to the end of the child-rearing years and then drops off. For specific trip purposes, certain stages in the life cycle may be more influential than others. In terms of other life cycle patterns, single-parent families travel considerably less, and single-person households register a decline in travel over their life cycle. Information on the composition of households (in terms of life cycle stage) could be used to forecast changes in the demand for energy.